AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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DECEMBER, 1921

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Dalton, and Atlanta, Ga.

National Sulfindone Blue B Conc.

An Indigo Shade Sulphur Color

THE National submits this new product yielding indigo shades, as superior to any dye of its class that has ever been offered in this market.

Your inquiries as to its exceptional properties are invited.

National Aniline and Chemical Co., Inc.

New York
Boston
Chicago
Hartford
Charlotte

THE FIRST AND LARGEST MAKERS of COAL-TAR DYES IN AMERICA

NATIONAL U.S.A. DYES

Montreal
Toronto
Providence
Philadelphia
San Francisco

NATIONAL DYES

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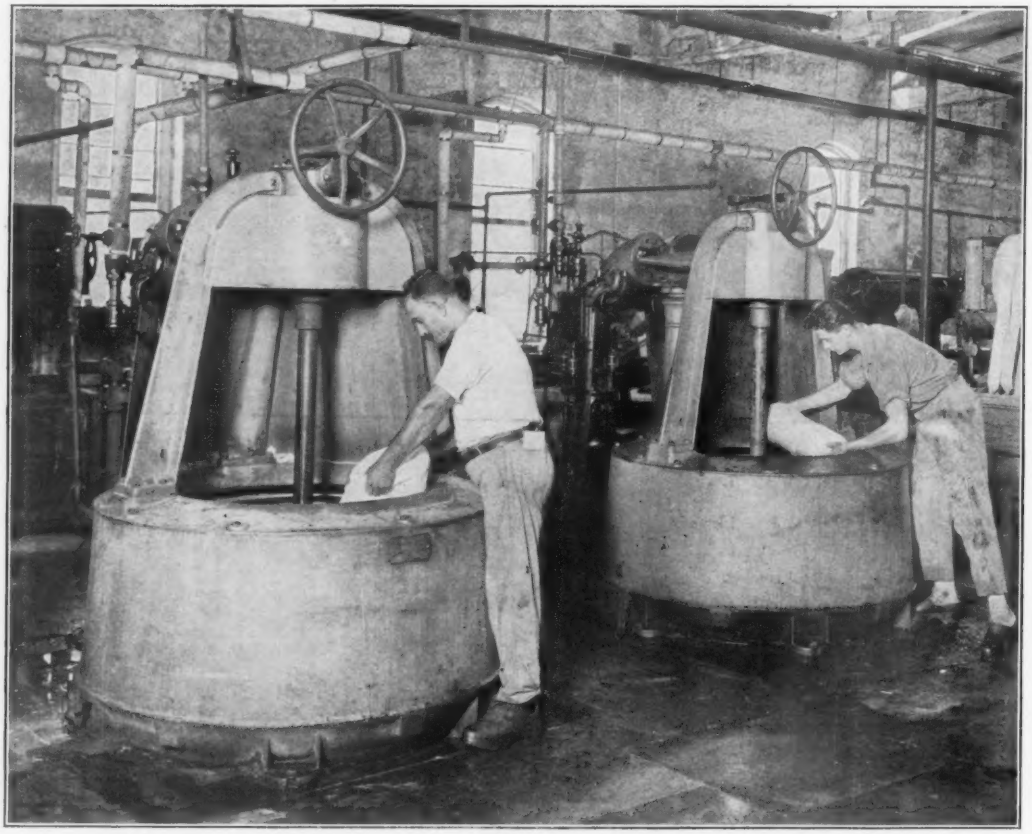

TOLHURST EXTRACTORS

are pre-eminent in High Speed Production

Here is an illustration of their usefulness in the Textile field. It represents two 48″ engine driven **Tolhurst** "Self-Balancing" Extractors whizzing piece goods after dyeing. This plant, a well-known silk-dyeing factory, has sent us seven repeat orders—a definite proof of satisfactory service.

If you are interested in high-speed production, where hydro-extraction plays or should play a part, send for particulars.

Tolhurst "Self-Balancing" Extractors are constructed with baskets 12″ to 72″ in diameter and are arranged for motor, countershaft or engine drive from above or below.

TOLHURST MACHINE WORKS

Established 1852 **TROY, NEW YORK**

New York Office, 111 Broadway

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Realty Bldg.,
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400 McGill Bldg., Montreal.

NORTHROP

TRADE-MARK REG U S PAT OFF

LOOMS

ON WORK THAT CAN BE WOVEN

WITH ONE SHUTTLE

SAVE 50 TO 75 PER CENT.

OF THE LABOR COST OF

WEAVING AND PRODUCE

BETTER GOODS

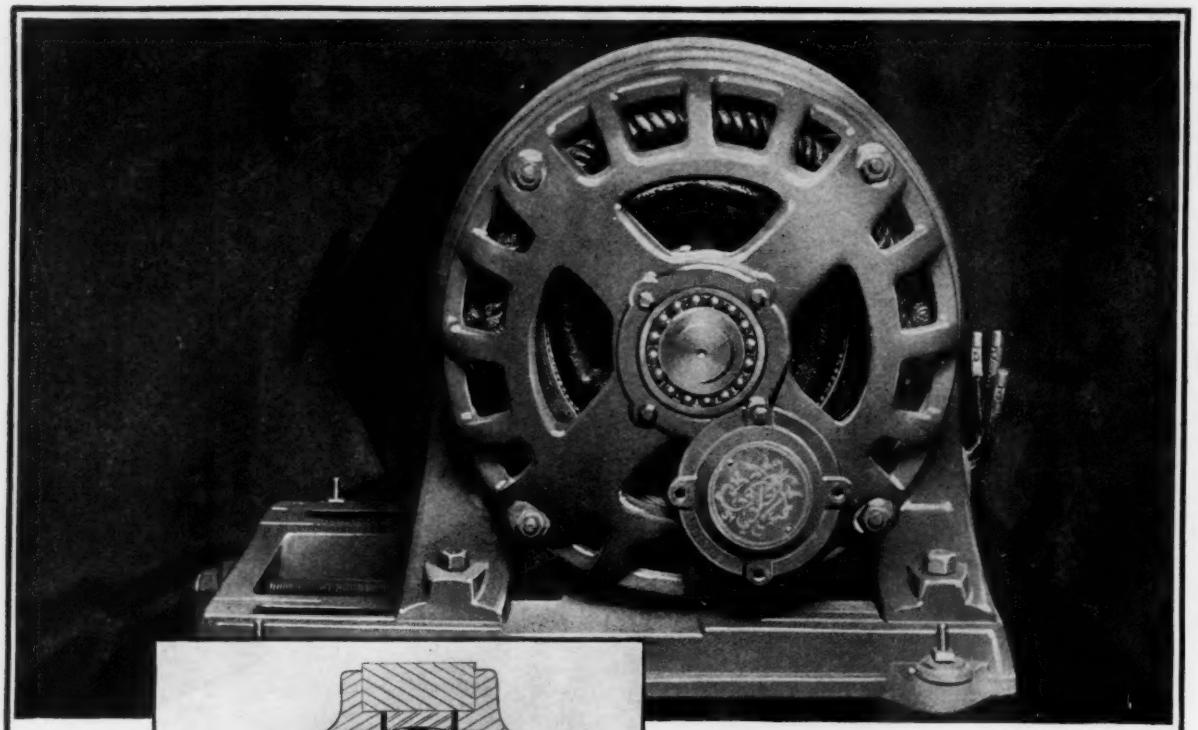
DRAPER CORPORATION

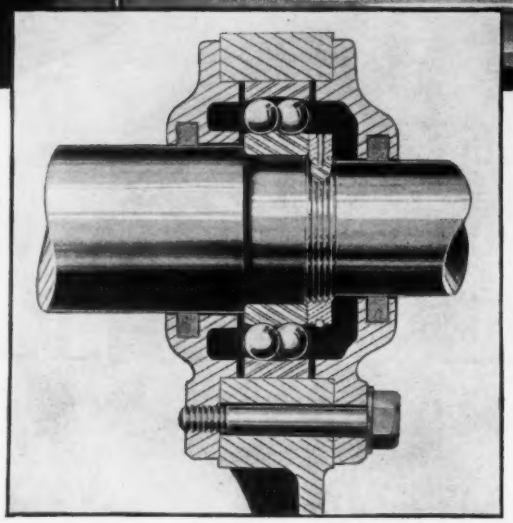
HOPEDALE

MASSACHUSETTS

ATLANTA GEORGIA

Copyright 1917 by Draper Corporation





The twenty-horse-power induction motor with end cap removed showing the self-aligning ball bearing. Note that the ball bearings are contained within simply constructed bearing head brackets with liberal lubricant chambers, which are sealed on both sides by end caps. These end caps are fitted close to the motor shaft and are practically proof against leakage of lubricant, as well as the intrusion of moisture, dust, lint, grit and other foreign substances from without.

The use of ball bearings in electrical machines—

has been a continuous growth and is fast coming to be considered vital to the best mechanical practice in the design of electrical machinery. So marked is this fact that today the leading manufacturers of electrical machinery have a standard line of ball bearing motors.

Self-aligning ball bearings marked **SKF** are particularly adapted for motor uses and are so nearly frictionless that wear is practically eliminated. This insures perfect rotor alignment almost indefinitely with a constant high efficiency air gap for maximum motor life. And because they are wear-free, the bearings run cool and require a minimum of lubrication and attention.

The engineering experience of our organization is at your disposal. You are urged to submit your bearing problems to us for careful and impartial consideration.

The Skayef Ball Bearing Co.

Supervised at the Request of the Stockholders by

SKF Industries, Inc.

165 Broadway, New York City

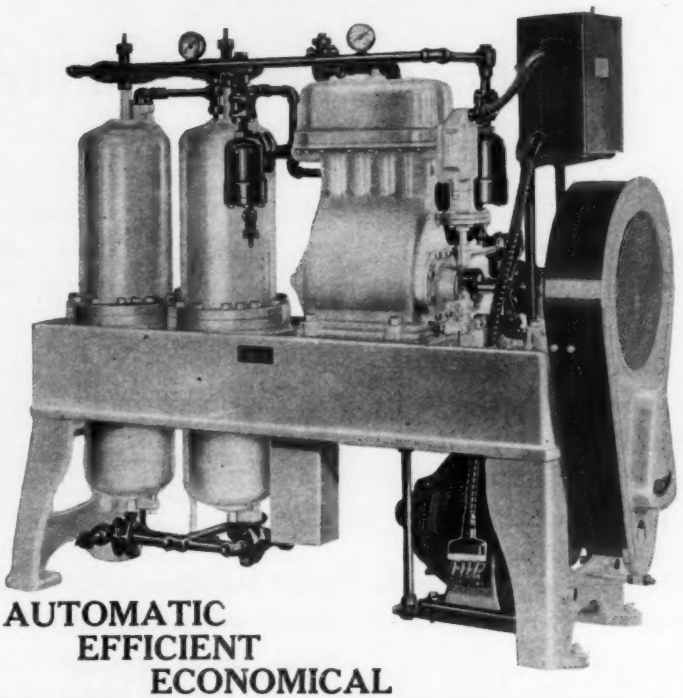
623

Lipman

AUTOMATIC REFRIGERATION

Drinking Water Systems

Cold drinking water, easily accessible from Sanitary Drinking Fountains at convenient points in your mill, club rooms, recreation halls, cafeterias, etc., not only increase the efficiency of your employees, but also pay a dividend wherever installed, owing to the saving over the cost of cooling water by the old ice method.



Is it worth while to you to Modernize; to increase the Efficiency of your Employees? To save time for Production — at the same time saving considerably over half the expense of your present system and eliminating the unsanitary features and the danger of disease so commonly spread by drinking vessels used by all the workers? Clean drinking water, properly cooled, and maintained at the same temperature throughout the year is indispensable to properly care for the welfare of your operatives. It is a recognized fact that to eliminate disease in the mill villages, is more than a dividend payer.

AUTOMATIC
EFFICIENT
ECONOMICAL

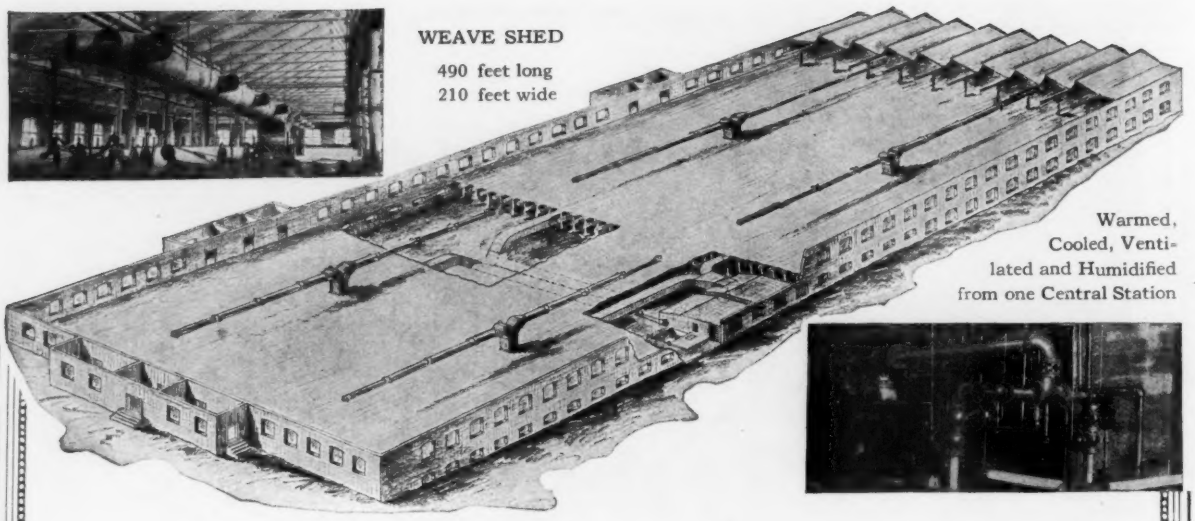
An ammonia machine with automatic mercury control is the basis of the excellent cooling feature of the Lipman Drinking Water System. The mercury control automatically starts the machine, when the temperature reaches the point above that at which the control is set. When the proper temperature is gained the machine is automatically stopped by the mercury control. Everything is automatically operated, and no special engineer or mechanic is required to operate and maintain the the Lipman Drinking Water System.

Write for Complete Information.

Miles Refrigerating Company

292 PEACHTREE STREET **ATLANTA, GA.**

WEAVE SHED
490 feet long
210 feet wide



Warmed, Cooled, Ventilated and Humidified from one Central Station

Heating, Ventilating and Humidifying by Central Station

We remember the heating business when the customer told the contractor how many and what size pipes he wanted. He does'nt do that now.

The humidifying business has passed through the same phase. With little classified in the way of data, one man's guess was as good as another's.

Now the approach to an industrial heating and humidifying problem (ventilating and cooling if you wish), is an engineering study. Data is available and classified. What was a guess is now a science.

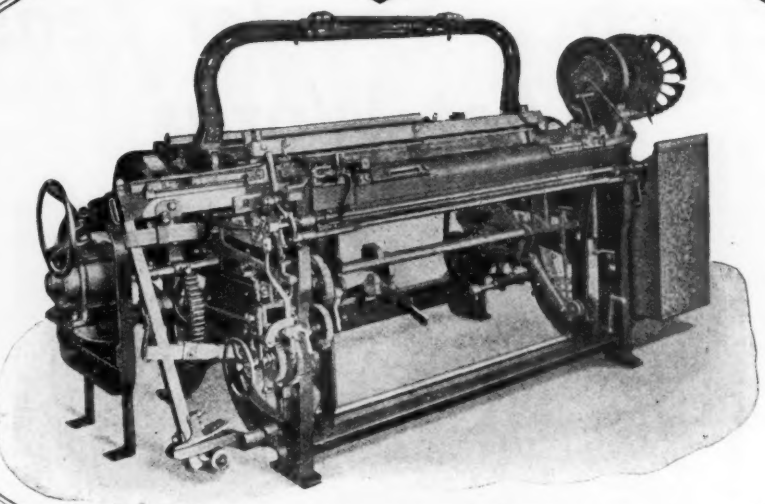
We try to ascertain what the customer's problem is. Then having several methods by which it may be solved we try to select the best one. Clients in Liverpool, England; Richmond, Virginia; Winston-Salem, N. C.; Jersey City, N. J.; and Three Rivers, Massachusetts, have selected Parks-Cramer central station equipment—to speak offhand of current activities.

Central station heating, ventilating and humidifying calls for highly specialized apparatus, skillful engineering—and craftsmanship of the highest order.

This type of equipment costs a lot of money—more than some would consider desirable to spend. But as in one case, 2.7 yards of cloth per loom per day added to production is looked upon by the owners as a very satisfactory return on central station heating and humidifying equipment.

Send for bulletin No. 322

Parks-Cramer Company
Engineers & Contractors
Industrial Piping and Air Conditioning
Fitchburg Boston Charlotte



Stafford Automatic Bobbin-Changing Loom

ADAPTABILITY

All 1 × 1 fabrics may be woven on Stafford automatic looms. It makes little difference what the goods may be —plain or fancy, coarse or fine, all show substantial saving in weaving costs. Cop or bobbin filling can be used equally well.

Stafford looms are now built with either shuttle or bobbin-changing automatic features.

THE STAFFORD COMPANY
READVILLE, MASS.

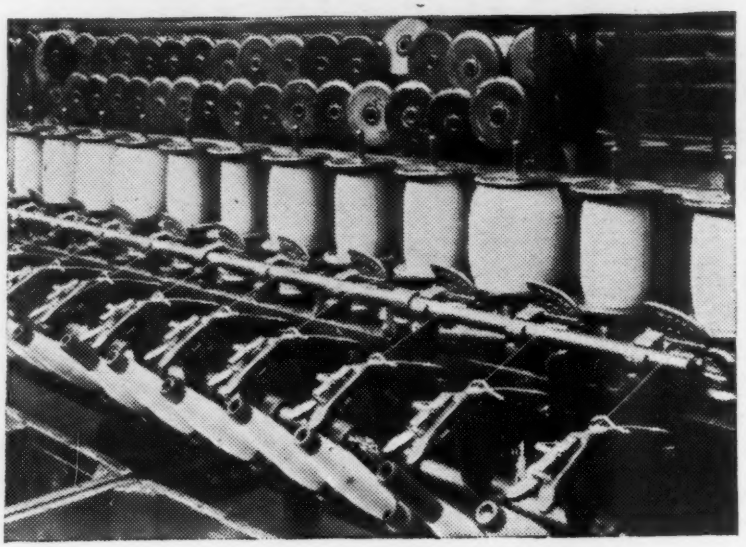
J. H. Mayes,
Southern Agent,
Charlotte, N. C.

Whitehead, Emmans, Ltd.
Canadian Representatives
Montreal, Canada

Paterson Office
502 Colt Bldg.
Paterson, N. J.

AUTOMATIC
STAFFORD
LOOMS

A Practical Spooler Tension That Works



L-V-B Tension Device in New Bedford Mills.

L-V-B SPOOLER TENSION

Produces Greater Production and Better Spinning

Change from Warp to Filling Wind. Try it out at our expense.

Send 2 filled bobbins and we will forward sample tension on approval.

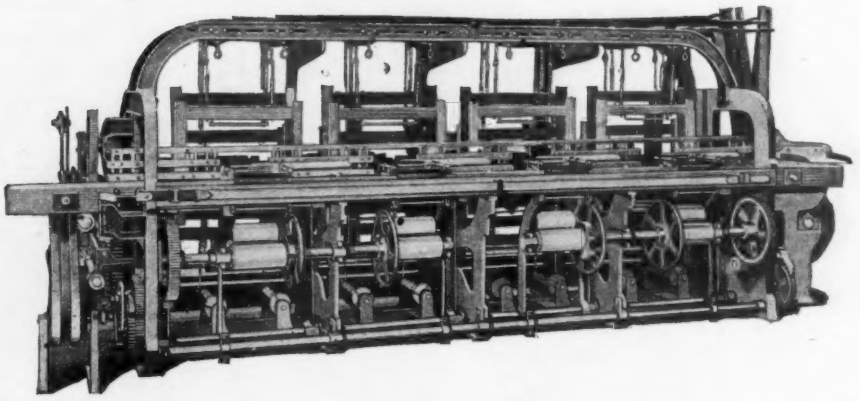
50% Saving in Waste. Ask for a list of Mills that are using L-V-B Tensions.

Address

Textile Specialty Company

P. O. Box 531, New Bedford, Mass.

FLETCHER
HEAVY WEBBING LOOMS



are the Standard for Weaving Solid Woven Belts and Asbestos Brake Lining.

Never was the time more opportune to survey your weaving machinery equipment and tune it up for high pitch production at the lowest possible cost.

The time for economical production is here. There is no machinery investment you can make which yields so great a return—dollar for dollar—as FLETCHER WORKS (Schaum & Uhlinger) Looms.

These looms are of rigid construction
Are compact and easily operated
Are reliable under all conditions
Are finished with the time, material and labor saving devices for which this house has been noted since 1850.

Our engineers are at your call to help you in a survey of your plant.

FLETCHER WORKS

(FORMERLY SCHAUM & UHLINGER)

Glenwood Avenue, at Second Street, Philadelphia, U. S. A.

Also Manufacturers of

FLETCHER HIGH SPEED RIBBON LOOMS **FLETCHER ELASTIC WEBBING LOOMS**
FLETCHER COTTON TAPE LOOMS **FLETCHER CENTRIFUGAL EXTRACTORS**
FLETCHER MULTICONE CLUTCH

LIST *of* MEMBERS

Each has subscribed to and is maintaining the highest standards of practice in it's editorial and advertising service.

Advertising and Selling
American Architect & Architectural Review
American Blacksmith, Auto & Tractor Shop
American Exporter
American Funeral Director
American Hatter
American Machinist
American Paint Journal
American Paint & Oil Dealer
American Printer
American School Board Journal
Architectural Record
Automobile Dealer and Repairer
Automobile Journal
Automotive Industries
Bakers Helper
Bakers Weekly
Boiler Maker (The)
Boot and Shoe Recorder
Brick and Clay Record
Buildings and Building Management
Building Supply News
Bulletin of Pharmacy
Canadian Grocer
Canadian Machinery & Manufacturing News
Canadian Railway & Marine World
Candy and Ice Cream
Chemical & Metallurgical Engineering
Clothier and Furnisher
Coal Age
Coal Trade Journal
Concrete
COTTON
Daily Metal Trade
Distribution and Warehousing
Domestic Engineering
Dry Goods Economist
Drygoodsman
Dry Goods Reporter
Electric Railway Journal
Electrical Merchandising
Electrical Record
Electrical World
Embalmers' Monthly
Engineering and Contracting
Engineering and Mining Journal
Engineering News-Record
Factory
Farm Implement News
Farm Machinery — Farm Power
Fire and Water Engineering
Foundry (The)
Furniture Journal
Furniture Manufacturer and Artisan
Furniture Merchants' Trade Journal
Garment Weekly (The)
Gas Age-Record
Good Furniture Magazine
Grand Rapids Furniture Record
Haberdasher (The)
Hardware Age
Hardware & Metal

Lower Prices *through* *Wise Buying*

NOT by dickering and bargaining, not through a "buyers' strike," not by fanning the fires of ruthless competition—these are but shallow expedients without permanent value.

There is but one way in which prices can be brought down to stay down, and in a way which will not kill the cow to get the milk—that is by a reduction in the cost of making and marketing.

In both these operations the buyer can play a vital part. The best equipped factory cannot operate economically without a sustained demand for its goods which will enable *mass production*, and it cannot sell economically except through *mass marketing*.

IT IS to your interest to know that goods are *well sold*, as well as well made. You have to pay the cost of selling just as you have to pay for the cost of manufacturing. Think that over.

And the cost of selling is no small item. In some cases it costs more to sell goods than to make them. The seller who clings to antiquated, expensive methods of selling is no more entitled to your patronage than the one who runs an out-of-date factory, because *you have to pay* the additional costs in either case.

If the waste is to be squeezed out of selling, the buyer cannot escape a share of the responsibility in bringing it about.

THIS means recognizing in a substantial way the efforts of those sellers who have adopted modern, economical methods of selling, and one of these beyond any question is good advertising in good Business Papers. Advertising not only cuts the cost of selling, but it increases production volume and lowers manufacturing costs. It standardizes quality, and is a guarantee of good faith.

The sooner buyers begin to put this idea into practice in real earnest, the sooner will the benefits be manifest.

LIST *of* MEMBERS
(*Continued*)

Heating and Ventilating Magazine
Hide and Leather
Hospital Management
Hotel Monthly
Hotel Review
Illustrated Milliner
Implement and Tractor Age
Implement & Tractor Trade Journal
Industrial Arts Magazine
Inland Printer
Iron Age
Iron Trade Review
Lumber
Lumber Trade Journal
Lumber World Review
Manufacturers' Record
Manufacturing Jeweler
Marine Engineering & Shipping Age
Marine Review
Millinery Trade Review
Mill Supplies
Mining and Scientific Press
Modern Hospital (The)
Motor Age
Motorcycle and Bicycle Illustrated
Motor Truck
Motor World
National Builder
National Cleaner & Dyer
National Laundry Journal
National Petroleum News
Nautical Gazette
Northwest Commercial Bulletin
Northwestern Druggist
Oil News
Oil Trade Journal
Power
Power Boating
Power Farming Dealer
Power Plant Engineering
Price Current—Grain Reporter
Printers' Ink
Railway Age
Railway Electrical Engineer
Railway Maintenance Engineer
Railway Mechanical Engineer
Railway Signal Engineer
Retail Lumberman
Rock Products
Rubber Age
Sanitary & Heating Engineering
Shoe Findings
Shoe and Leather Reporter
Shoe Retailer
Southern Engineer
Southern Hardware & Implement Journal
Sporting Goods Dealer
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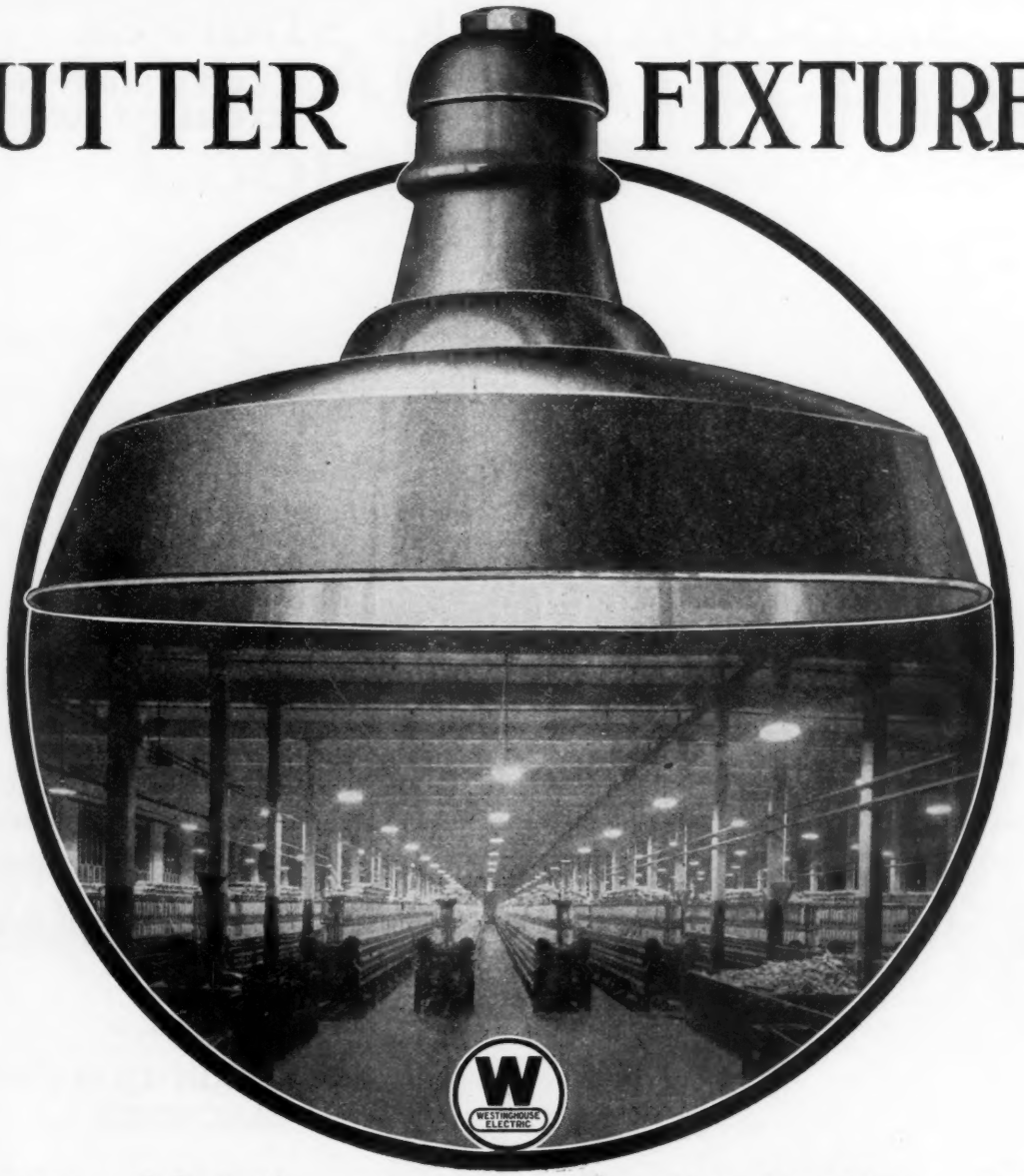
Tea and Coffee Trade Journal
Textile World
Welding Engineer
Wood-Worker (The)

THE ASSOCIATED BUSINESS PAPERS, Inc.

JESSE H. NEAL, *Executive Secretary*

HEADQUARTERS: 220 West 42nd STREET NEW YORK CITY

CUTTER FIXTURES



Better Lighting Increases Production 17%

The manager of an important Textile Mill is authority for the following statement:

"The production test on the spinning machines has shown an increase of approximately 17 per cent in material turned out. The material coming from the machines was weighed under normal conditions for two successive days averaging 59.4 pounds per hour. Without changing any other factor except that of the light, which was raised from 1.5 to 9.0 foot-candles, the material coming from the machines was again weighed for two successive days, the amount turned out averaging 70.1 pounds per hour.

The increase is rather noteworthy, as it was impossible to advance the speed of the machines, the only chance for a gain in production being in the stimulation the operator experienced under the increased lighting, resulting in more rapid movements during the periods when hand operations were required on the machines."

Equally gratifying increased production results are obtained by better lighting in weave rooms, winding rooms, and other departments of textile mills.

Cutter Reflectors with Westinghouse Mazda Lamps will do the same for you.

Westinghouse Electric & Manufacturing Company

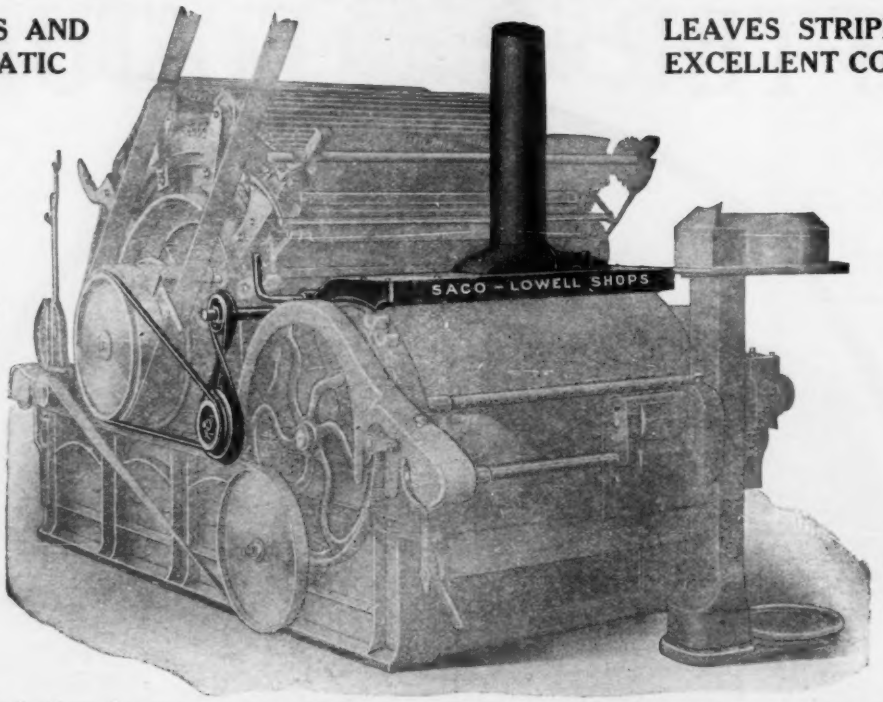
George Cutter Works, South Bend, Indiana.

Westinghouse

SACO-LOWELL CARD STRIPPER

DUSTLESS AND AUTOMATIC

LEAVES STRIPPINGS IN EXCELLENT CONDITION



Economical to Operate

Saves Time and Labor

Strips Card Clean

Sanitary and Efficient

Low Cost of Maintenance

Simple, Durable, Practical

Control Always Absolute

Full Information Furnished

Rogers W. Davis, Southern Agent
CHARLOTTE, N. C.

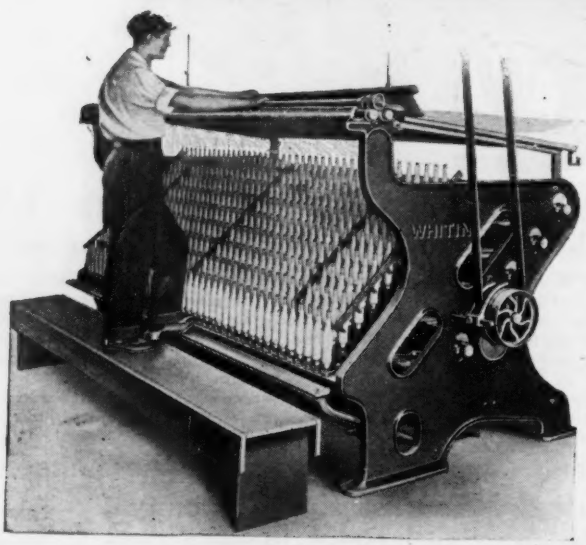
Saco-Lowell Shops, Newton Upper Falls, Mass.

Southern Branch Office
GREENVILLE, S. C.

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



Manufacturers of

LONG-CHAIN QUILTING MACHINES

for

Colored, Bleached and Mercerized Yarns

The Use of This Machine Insures:

First Quality in Production,
Increased Profits,
Reduced Labor Costs,
Savings in Power Consumption,
Economy in Floor Space.

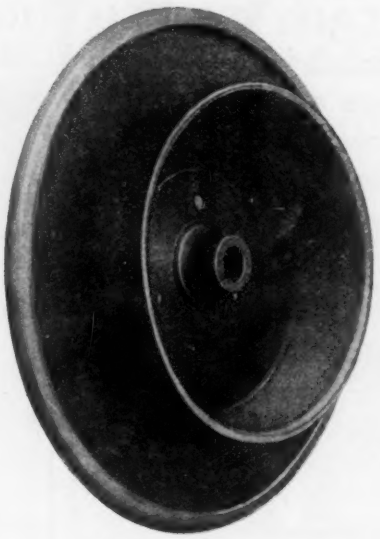
Full particulars on request.

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

ALL STEEL
Loom Beam Heads



Patent Pending

for

Replacement of broken heads and new equipment.

Absolutely guaranteed unbreakable. Will not bend or spring in warping or in handling.

Construction is such that your cast iron head can be duplicated in detail.

Patent Pending

Send us sample of your cast iron head and ask for samples of All Steel to replace.

All Steel Section Beam Heads are a new development. Do not judge them until you have tried them out.

Guaranteed not to bend or spring under the pressure of the yarn or in the usual handling and transportation.

Made in all standard sizes. Suitable for beaming when so specified.

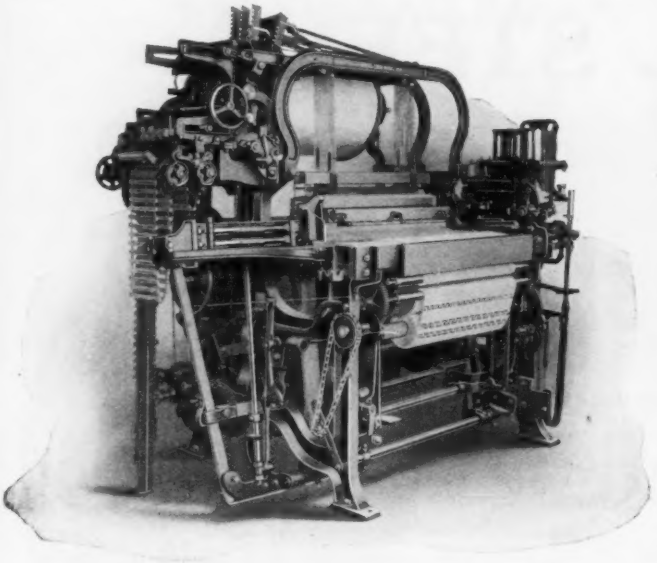
Elastic and Non-Elastic Beam, Steel Headed Jack Spools, "High Speed" Braider Carriers, Braider Bobbins, "New Process" Drop Wires.

Ask for Samples.

Patented June 7, 1921

Mossberg Pressed Steel Corporation

Attleboro, Mass.



Automatic Terry Towel Loom

The AUTOMATIC TERRY TOWEL LOOM shown here, is of the Dobby type and is used for weaving towels with colored borders.

A large number of these looms are running successfully with increased production per weaver and greatly reduced operating costs.

CROMPTON & KNOWLES LOOM WORKS

—WORCESTER, MASS.—

PROVIDENCE, R. I. PHILADELPHIA, PA. PATERSON, N. J.

ALEXANDER & GARSED—Charlotte, N. C.—Southern Representatives

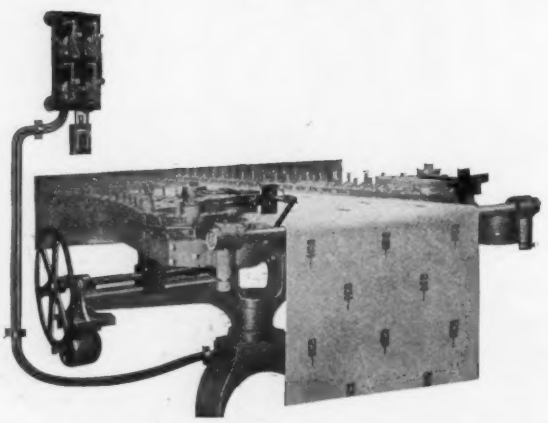
American Textile Machinery Corp., 47 Ave. de l'Opera, Paris—Representatives for Continental Europe

DECREASE COSTS

by installing

THE SCHWARTZ AUTOMATIC ELECTRIC GUIDER

PATENTED



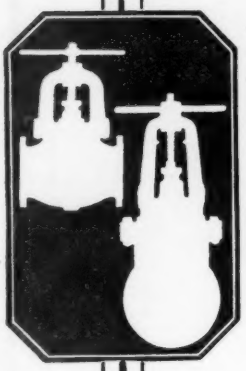
Used on all kinds and weights of cloth.

Write us for further information.

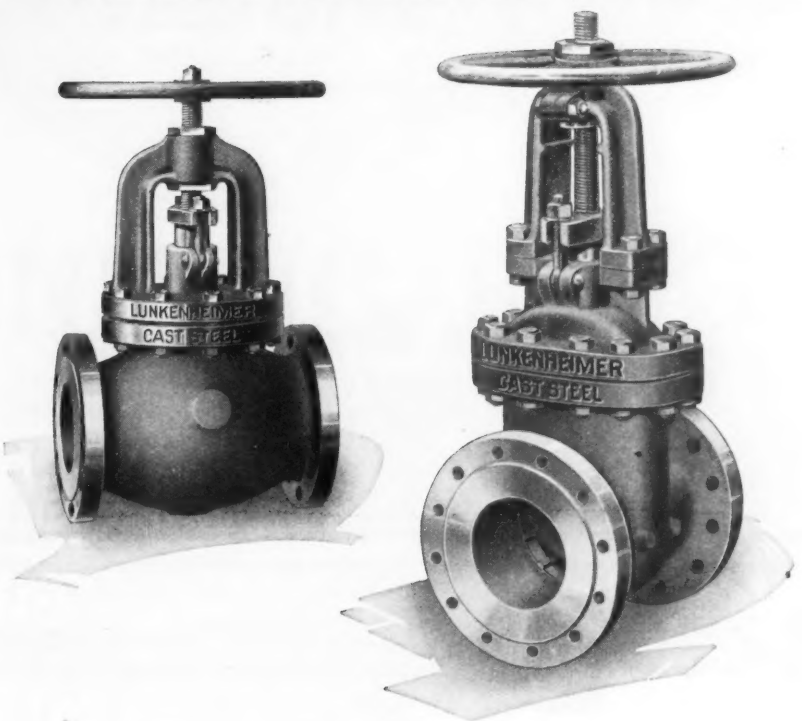
Manufactured and Distributed by

BLAKE ELECTRIC MFG. COMPANY,

1 ROWES WHARF, BOSTON, MASS.



LUNKENHEIMER
Cast Steel Valves



The exacting conditions imposed by the high pressures, high temperatures, and high superheats of the present-day steam power plant, demand the utmost care in valve design and in the selection and fabrication of the materials entering into their construction. Lunkenheimer Cast Steel Valves fulfill all requirements.

In design, every individual part has been given most careful consideration, insuring utmost serviceability of the valve as a whole.

Lunkenheimer "Valve-Steel"—one of the principal factors to which the successful service results of Lunkenheimer Steel Valves may be attributed —insures homogeneous structures of high ductility, which structures are made possible only by the Lunkenheimer process,—a process embodying the use of the electric furnace for melting and refining and scientific control of all other factors.

The trimmings of Lunkenheimer Cast Steel Valves are made of materials especially adapted for high pressures and temperatures—their composition depending upon service conditions.

The broad scope of the Lunkenheimer line of Cast Steel Valves provides a type and size for every service requirement.

Distributors of Lunkenheimer Products situated in every commercial center.

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF
HIGH GRADE ENGINEERING SPECIALTIES
IN THE WORLD
NEW YORK CHICAGO CINCINNATI BOSTON LONDON
EXPORT DEPT. 129-135 LAFAYETTE ST., NEW YORK

CURRENT EDITION
OF CATALOG BEARS
No 58
COPIES PROCURABLE FROM
LUNKENHEIMER
DISTRIBUTORS

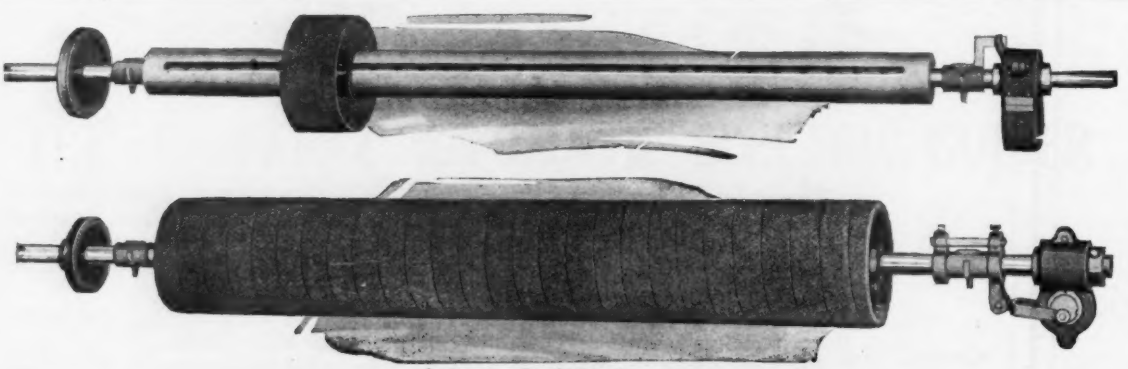
15-16-10

When you buy a hundred picker sticks do you get a hundred good sticks?

Southern Bending Company

Johnson City, Tennessee

Manufacturers of good Picker Sticks



Cotton Card Grinders.

Will Roy Grinders Be a Good Investment?

PROVE IT TO YOURSELF

If you are in doubt as to whether a Roy Grinder will be a good investment in your mill, it will put you under no obligation to take advantage of our trial offer.

To any reputable mill we will send a sample set of two improved Roy-Hardy Screw Traverse Grinders (top view) and one improved Roy-Hardy Steel Roller Grinder (bottom view) f. o. b. Worcester, Mass. Put these grinders through any test you want to—compare their efficiency with any other grinder on the market, and if they don't live up to our claims for Roy superiority, send them back.

Write for full details

B. S. ROY & SON CO., Worcester, Mass.

Established 1868

E. M. TERRYBERRY, Southern Agent, 1126 Healy Bldg., Atlanta Ga.

SPINNING RING

GROUND to Fight Friction—
RIGHT in Design—
EFFECTS Mill Economy—
INVESTMENT worth while—
SPINS a strong, high quality yarn—
TRUE Traveler Track

The Greist Manufacturing Company

Precision Manufacturers for 40 Years

Dept. C, New Haven, Conn.

Southern Representative:
The G. G. Slaughter Machinery Co.
Greenville, S. C.

Fall River and New Bedford:
Coldwell Gildard Company
108 Hartwell Street, Fall River, Mass.

New England Representative:
Boyd's Textile Bureau, F. W. Boyd, Mgr.
339 Butler Exchange, Providence, R. I.

VERMONT SPOOL & BOBBIN CO.

OF

BURLINGTON, VERMONT.

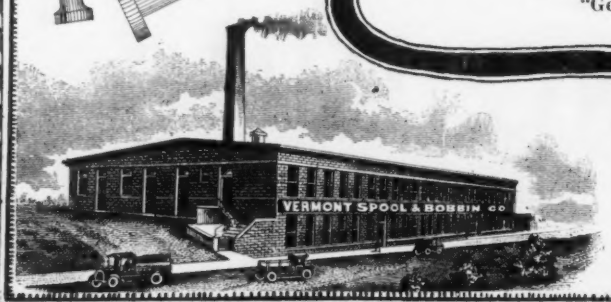
There are two prime requisites in the production of superior bobbins and spools—the plant and long experience. We have both.

Our plant is equipped with the most up-to-date and efficient machinery. From the selection of the wood to the finishing of the product the same care is exercised in every department—uniform bobbins and spools of the highest class being the result.

Our long experience in the design and manufacture of spools and bobbins for textile mills all over the country enables us to understand your requirements and give you 100% satisfaction.

Give us a trial order and you will remain one of our satisfied customers. Write for prices.

"Good Goods at Fair Prices."



Howard Bros. Mfg. Co.

Established 1866

Atlanta, Ga. Worcester, Mass. Philadelphia, Pa.

CARD CLOTHING

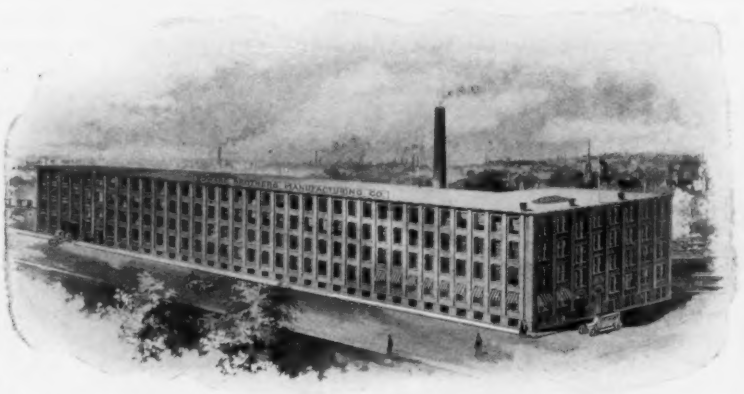
Napper Clothing

Wire Heddles

Cylinder Fillets

Doffer Fillets

Top Flats Reclothed



Hand Stripping Cards

Stripper Fillets

Burnisher Fillets

Emery Fillets

Southern Agents

E. M. TERRYBERRY, 1126 Healey Building, ATLANTA, GA.

The Use of Ice and Refrigerating Machines In The Textile Mill—

Since the advent of mechanical refrigeration as a means of producing low temperatures its uses have increased until there are very few lines of business in which it is not used at the present time in some manner or other.

But this must be done in an efficient, sanitary and economical manner.

"SOUTHERN" ICE AND REFRIGERATING MACHINES are efficiently adapted to do this.

To cool the different chemicals used in the preparation of goods in the dye house, finishing plant, the most economical and efficient means is by installing the refrigerating machine that can produce the desired results.

Many mills have their own dairies, and to cool the milk and other dairy products in a sanitary manner the proper machine must be used. For making ice for the use of the mill employees, refrigerating meats, groceries, etc.

For general cold storage, Ice making, in your Hospitals, the use of this machine will prove a paying investment.

Let our representative call on you, and give you full details.

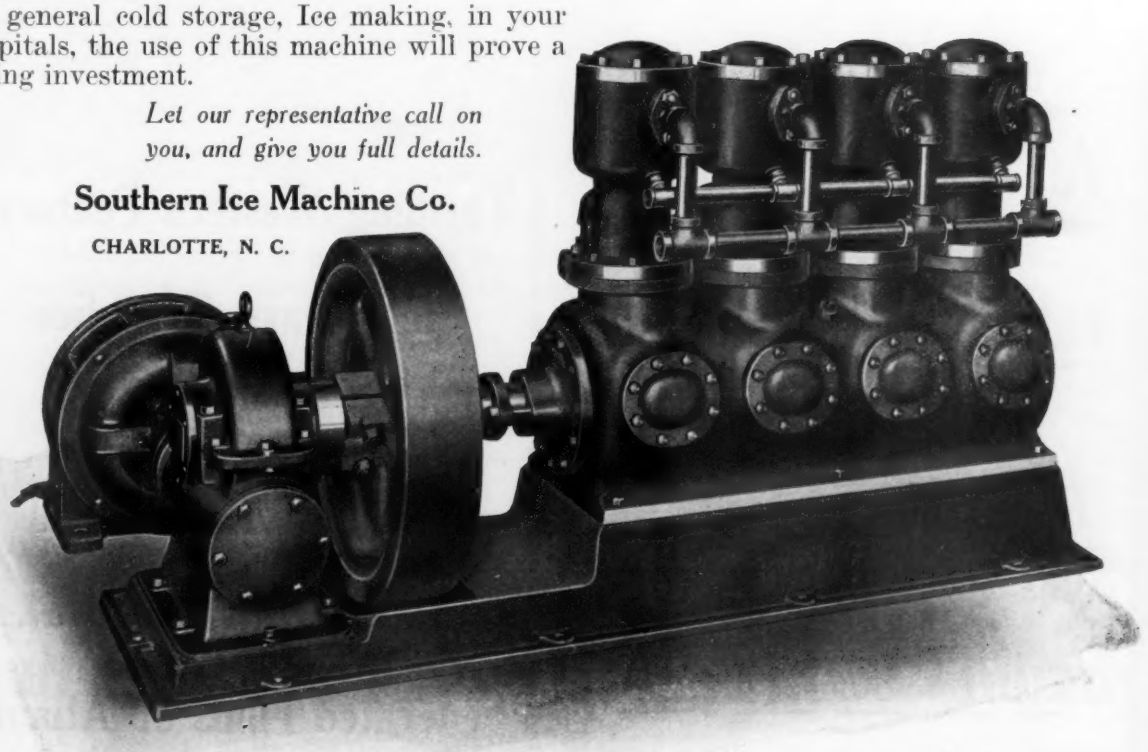
Southern Ice Machine Co.

CHARLOTTE, N. C.

Southern

IMPROVED

Ice Making and Refrigerating Machines



SIX TON
REFRIGERATING CAPACITY

MOVING PICTURES

We Understand Your Requirements

ALL

Pictures Booked You Are Personally Selected

NO

Pictures of strife or other objectionable matter carried in our stock

LET US BOOK YOU!

Industrial Bookings of Pictures is Our Specialty

NATIONAL EXCHANGES, Inc.

SAVINI FILMS, Incorporated

63 Walton St.

ATLANTA - GEORGIA

NOVELTIES

ACTION WESTERNS

STARRING

Neal Hart and Wm. (Bill) Fairbanks

SERIALS

Released one every week Twelve Fairbanks, eight Harts. The newest product of these stars.

"Go Get Him," "Broadway Buckaroo", "A Western Demon, "Hell's Border" the first four titles

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Drop Us a Line for Quotations

Southern States Film Co.

111 Walton St., Atlanta, Ga.

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MOVING PICTURE

ATTRACTIONS

—THAT WILL—

PLEASE YOU & PLEASE YOUR PATRONS

PICTURES

THAT WILL FILL YOUR THEATRE

FILL YOUR POCKETS

AND FILL YOUR OPEN DATES

Arthur C. Bromberg Attractions

61 WALTON ST., ATLANTA, GA.

We can serve you with

Thrilling Western Features

High Class Comedies

and

A Big Animal Serial

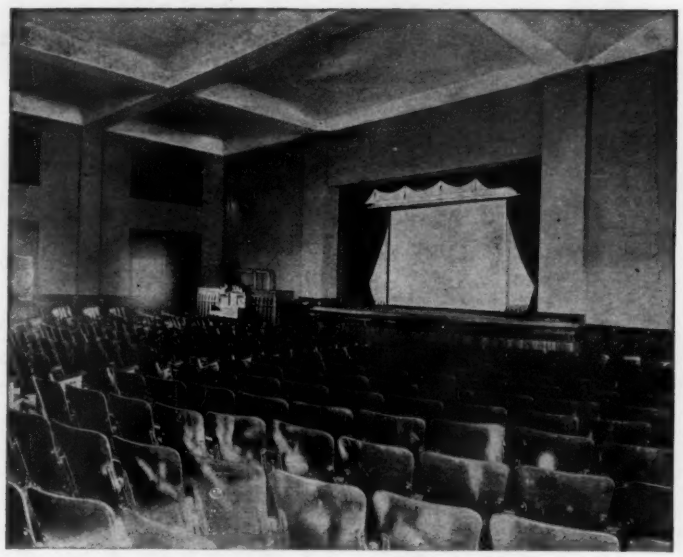
All we ask is a trial.

Federated Films of Atlanta

146 Marietta St. Atlanta, Ga.

Is Your Name Written There?

Our service to the textile mills is the result of years of experience in installing textile theatre equipment. Our representatives call upon the mills personally, lay out the plans, advise on the proper equipment required and finally supervise the installation and the starting of the theatre. In other words, they take the whole problem off from your hands and do not turn over the work to you until the theatre is operating satisfactorily.



A Typical Textile Mill Theatre.

The textile industry is demanding the best moving pictures for their employees and that is why they regularly specify

POWER'S PROJECTORS

That is why more Power's Projectors are used by textile mills in the South than all other projectors combined.

Satisfied Users of POWER'S PROJECTORS

ALABAMA

W. A. Handley Mfg. Co.	Roanoke
Tallassee Mills	Tallassee
Fairfax Mill	Fairfax
Avon Mills	Sylacauga
Lanett Cotton Mills	Lanett
Indian Head Mills	Cordova
Selma Mfg. Co.	Selma

GEORGIA

Elm City Cotton Mills	La Grange
Bibb Mfg. Co.	Porterdale
Roswell Mfg. Co.	Roswell
Gainesville Cotton Mill	Gainesville
Bibb Mfg. Co.	Columbus
Pacolet Mfg. Co.	New Holland
Manchester Cotton Mills	Manchester
Milstead Mfg. Co.	Milstead
Thomaston Cotton Mills	Thomaston
Exposition Cotton Mill	Atlanta
Habersham Mill	Habersham
Trion Company	Trion
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NORTH CAROLINA

Durham Hosiery Mills	Durham
Pamona Mills	Greensboro
Cleveland Mill & Power Co.	Lawndale
Rodman-Heath Cotton Mills	Waxhaw
Rocky Mount Mills	Rocky Mount
Cherokee Falls Mfg. Co.	Cherokee Falls
Roxboro Cotton Mills	Roxboro
Consolidated Textile Corp.	Burlington
Carolina Cotton & Woolen Mills	Spray

SOUTH CAROLINA

Baldwin Cotton Mills	Chester
Tucapau Mills	Tucapau
Ware Shoals Mfg. Co.	Ware Shoals
Glenn-Lowry Mfg. Co.	Whitmire
Monaghan Mills	Greenville
Drayton Mills	Spartanburg
Victor Mills	Greer
Conestee Mills	Conestee
Kershaw Cotton Mills	Kershaw
Abbeville Cotton Mills	Abbeville
Chesnee Mills	Chesnee
Union-Buffalo Mills	Buffalo
Victor-Monaghan Mills	Seneca
Victor-Monaghan Mills	Jonesville
Pacolet Mfg. Co.	Pacolet
Aragon Mills	Rockhill
Graniteville Mfg. Co.	Vancluse
Woodside Cotton Mills	Greenville
Orr Cotton Mills	Anderson
Issaqueena Mills	Central
Clifton Mfg. Co.	Clifton
D. E. Converse Co.	Glendale
Winnsboro Mills	Winnsboro
Monarch Mills	Lockhart

We carry a complete line of supply parts and equipment at our various branches. Your orders for supply parts will be filled the same day the order is received. Whatever are your needs for your theatre, we can supply them.

We have a special offer for the Textile Mills. May we present it to you?

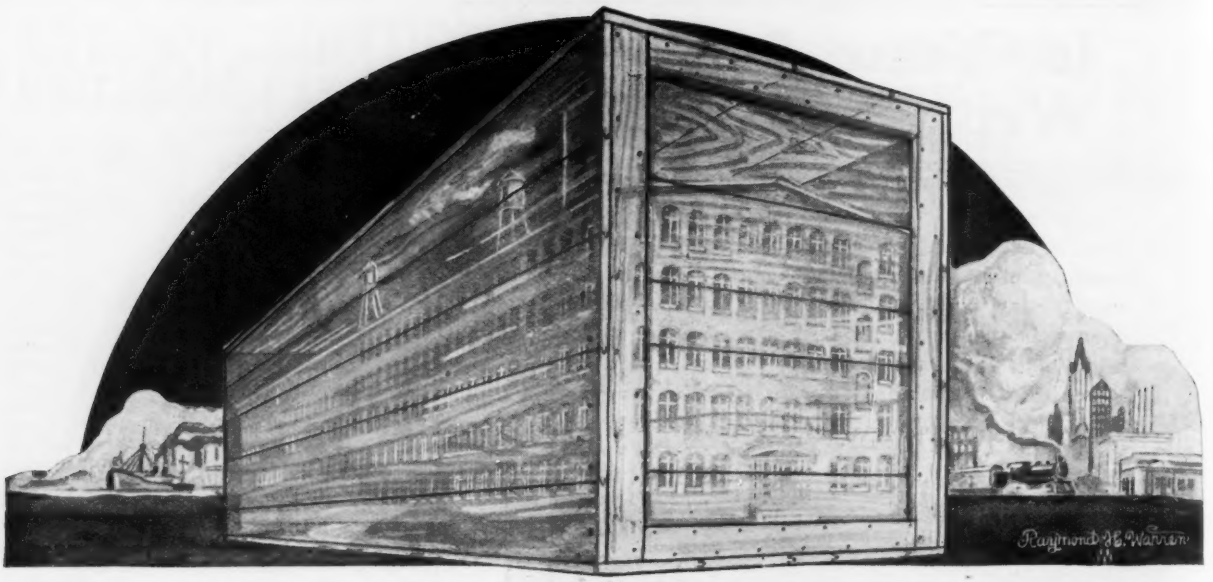
Southern Theatre Equipment Company

WILLIAM OLDKNOW, President,

No. Nine Nassau St.
ATLANTA, GEORGIA

THREE TWENTY-EIGHT CALIFORNIA ST.,
OKLAHOMA CITY, OKLA.

Eighteen Fifteen Main St.
DALLAS, TEXAS



Ship in the Wood Box
—all the products of your Mill

PRODUCTS of a textile mill are valuable. Easily damaged, they need complete protection in storage and in transit.

Good Wood Boxes are strong and dependable. They insure safe delivery of your product to Satisfied Customers.

Whether your shipments are heavy or light, bulky or compact, a wood box may be designed to fit your particular need.

Good Wood Boxes are built by the members of the National Association of Box Manufacturers.

Good Wood Boxes

Backed by the National Association of Box Manufacturers

GENERAL OFFICES
1553 CONWAY BUILDING, CHICAGO

New England:
1013 SCOLLAY BLDG.,
Boston, Mass.

Eastern:
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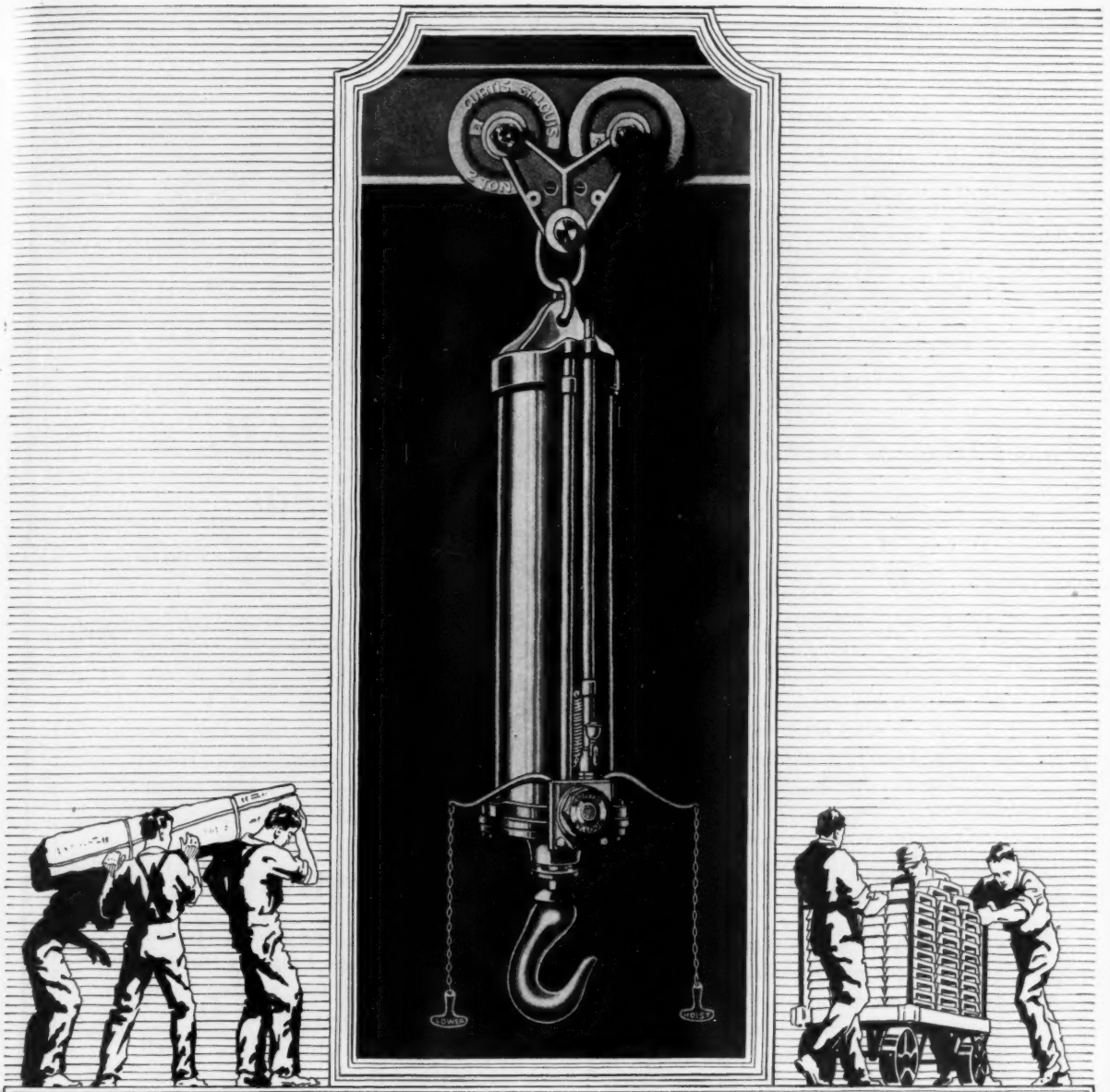
Baltimore, Md.



CURTIS AIR HOISTS and TROLLEYS
SAVE MAN-POWER

CURTIS Trolleys are constructed with self-equalizing steel side frames and large inclined wheels fitted with shock-absorbing Flexible Roller Bearings — making them easy to start — easy rolling and long lasting.

CURTIS All-Steel Air Hoists, in design and construction, present the perfected results of 25 years of manufacture. They are simple, safe and economical for light and medium loads. Capacities, 800 to 20,000 lbs.

CURTIS PNEUMATIC MACHINERY COMPANY

1571 Kienlen Avenue **ST. LOUIS, U. S. A.**

Branch Office: 532-R Hudson Terminal, New York City

How Jones gave the B——Mills a full Monday Morning Crew

"Give me a good man and a half-dozen girls and I'll give you a full crew on Mondays," said Jones, the superintendent at the B—— Textile Mills.

"Is that all you need to work this miracle?" laughed the General Manager.

"No,—I want some money but I'll pay it back, and with interest."

"What's the big idea?" asked the G. M.

"The big idea," replied Jones, "is a Mill Village Laundry—an AMERICAN Mill Village Laundry, to be correct."

"I'm going to take the family washing out of these peoples' homes—I'm going to give these women a chance to rest o' Sundays and evenings, and I'm going to have them here on the job, bright and chipper, every Monday morning, instead of steaming away over the old wash-tub at home."

"It sounds good," admitted the G. M., "but who's going to pay for it?"

"It's going to pay for itself, and more, —and we're going to do the family washing at less cost than these women can do it themselves, counting their time."

"I know that sounds strong, but I've been looking around—there are a dozen American Mill Village Laundries within 300 miles of this spot which are doing that very thing."

And Jones got his American Mill Village Laundry.

That was half a year ago. "If the American Mill Village Laundry stopped today, I reckon we'd have to stop along with it," says the enthusiastic G. M.

And he's almost right. Have us tell you more about the system that puts an end to wash-day layoffs. Write us today for the full story.

The American Laundry Machinery Company

Specialty Department C, Cincinnati, Ohio

This composite factory group shows the manufacturing plant of The American Laundry Machinery Company, the world's largest producer of laundry equipment, and originator of the American Mill Village Laundry. The service of this organization is sold with every American Mill Village Laundry installation.

When your hands are idle—*plant a tree*

SO counselled a wise old Scot who had witnessed many saplings reach the fullness of mature beauty. Living, a tree adds to the richness of life. Fallen, it is privileged to enter into the building of a home, a fine book, an admirably designed table, or serve as an humble carrier of goods.

"Only God can make a tree"—but any man may plant one. More power to the reforestation movement, which will make available an increasing supply of wood, sorely needed for this and succeeding generations.

The manufacturers who convert lumber into paper, building material, furniture, ships, boxes and ten thousand other useful forms recognize The National Shawmut Bank as an old established institution which heartily welcomes opportunity to be of assistance.

Many great shipments of lumber from the forests of Maine and Canada, as well as mahogany, teak, ebony and other imported hard woods, are financed through this bank. Where great distances separate the shipper from the receiver, Shawmut's world wide representation insures that all financial transactions will be under our constant supervision to insure accuracy and speedy transmission.

Shippers and buyers of lumber, also interested banks, are invited to use Shawmut's facilities

THE NATIONAL SHAWMUT BANK *of* BOSTON

Capital, surplus and undivided profits, $22,000,000

1865 Oldest National Bank in the Cotton States 1921

The Atlanta National Bank

SOUTHERN business men—manufacturers and merchants—have since 1865 found the Atlanta National Bank to be intensely interested in the things that go to make Southern prosperity—and to have an equal interest in every customer.

The Atlanta National Bank

IF YOU NEED BANKING SERVICE

in the South,
and especially in Georgia

You need The Citizens & Southern

Capital and Surplus $4,500,000

The Citizens & Southern system has completely equipped offices in Atlanta, Savannah, Macon and Augusta.

Each of these offices is connected with the others by direct private wires.

If you are a customer of either office, and want information or service of any kind from the other cities these wires and the complete organization are at your service.

Hundreds of direct correspondents all over the South make it possible to give you practically the same service wherever you want it.

The Citizens & Southern Bank

Atlanta—Marietta at Broad

Savannah Macon Augusta

"No account too large, none too small"

Uneven Laps Make Uneven Work

A foot of finisher lap becomes several miles of yarn, so it ought to be as even as possible to start with.

If the evener belt is slipping, the lap will have thin spots in it and you will lose a number of laps that don't weigh out right. Even those that do weigh right will not be uniform, but will merely contain a good average of thick and thin spots.

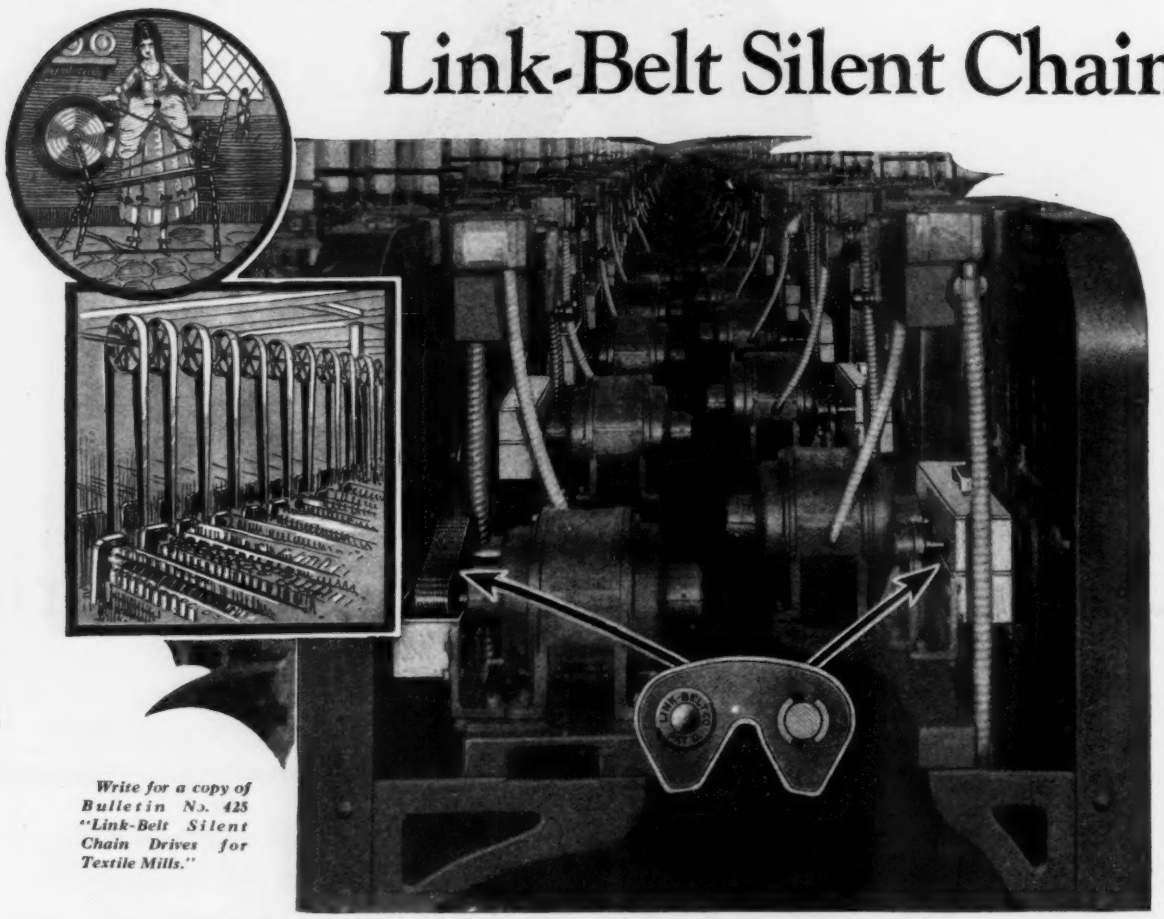
Strom Bearings will overcome this trouble by lifting the load that makes the evener belt slip.

Complete installations for your apron and evener rolls may be obtained from the Aldrich Machine Works, Greenwood, S. C.

U. S. Ball Bearing Mfg. Co.
(Conrad Patent Licensee)
4544 Palmer St. Chicago, Ill.

Strom BEARINGS

From Hand Power to Link-Belt Silent Chain



Write for a copy of Bulletin No. 425 "Link-Belt Silent Chain Drives for Textile Mills."

IN THE days of the old spinning wheel, hand power turned the wheel that spun the yarn. Just as this primitive form of power gave way to steam power, applied by belting, so is the latter rapidly making way for the greater efficiency, economy and dependability of electric power transmitted through Link-Belt Silent Chain Drives.

The lessons of the past show that if a manufacturer is to be successful he cannot cling to wasteful, obsolete methods, while his competitors, wide-awake to the march of industrial progress, adopt new methods that mean a better product at a lower cost of manufacture.

The use of Link-Belt Silent Chain Drives is not limited to spinning frames, but is suitable for a wide variety of textile mill drives.

824.

LINK-BELT COMPANY

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Buffalo	547 Ellicott Square
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CHICAGO

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Memphis, Tenn.	Reed & Duecker, 218-222 No. Front St.
Menominee, Mich.	Hamilton Machinery Exchange
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	DALLAS, TEXAS, 709 Main St.

LINK-BELT

BY INVITATION MEMBER OF

NEW YORK, U.S.A.

To have continued to successfully produce and market

THE T. B. WOOD SONS CO. LINE

of Power Transmission Appliances exclusively since 1857, is in itself an indication of the high regard that the American Manufacturers have for our product and the service that goes with it.

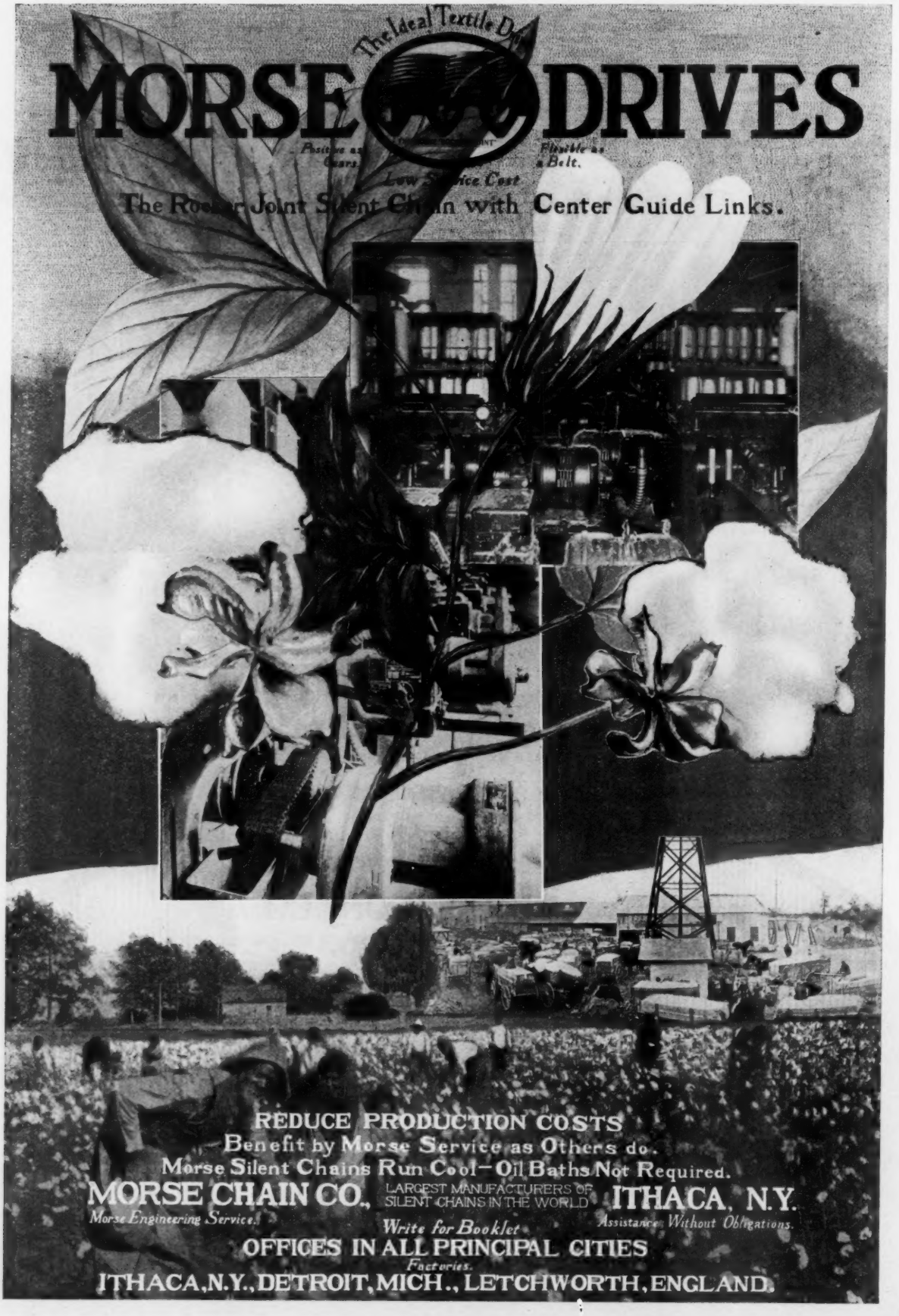
With our organization, the making of Pulleys, Hangers, Couplings, Friction Clutches, etc., has become an art of which we are justly proud.

A special line for **COTTON MILLS.**

May we be permitted to figure on your Transmission requirements?

T. B. WOOD'S SONS CO.
CHAMBERSBURG, PENNA.

THE T. B. WOOD SONS CO. LINE


The Ideal Textile Drive
MORSE DRIVES
Positive as Gears
Flexible as a Belt.
Low Service Cost
The Roller Joint Silent Chain with Center Guide Links.
REDUCE PRODUCTION COSTS
Benefit by Morse Service as Others do.
Morse Silent Chains Run Cool—Oil Baths Not Required.
MORSE CHAIN CO.
LARGEST MANUFACTURERS OF SILENT CHAINS IN THE WORLD
ITHACA, N.Y.
Morse Engineering Service
Write for Booklet
Assistance Without Obligations.
OFFICES IN ALL PRINCIPAL CITIES
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ITHACA, N.Y., DETROIT, MICH., LETCHWORTH, ENGLAND.

"Clings to Metal"

Does Your Mill Use D-A?

Thorough tests were made in representative Cotton Mills over a long period before D-A was presented to mills with our full guarantee.

Our Southern Representative, Mr. John K. Gewinner, of Atlanta, Ga., has specialized on Cotton Mill lubrication and during the past seven months has proved what D-A will do, and now over 300 mills in the South alone use D-A Lubricant. His personal service and advice is at your command.

MADE FROM THE BEST GRADE OF PENNSYLVANIA OIL

D-A is made by using the best grade of Pennsylvania oil and densifying it under our special process, without the addition of the ordinary "fillers" or "binders," which insures a high grade lubricant with a heat-resisting quality and long life not possessed by the average oil.

NO GREASE, GRAPHITE OR ACID

Heat, cold, or moisture does not affect its lubricating qualities. Will not thin down and throw off of gears or cams. Gears will not channel it in cold weather. Being a 100% mineral lubricant, it will not oxidize or crystallize and will never leave a hard gummy residue wherever it is used. Because of its wonderful affinity for metal, it works itself into every moving part and oil hole, no matter how small. It keeps an oily film between moving metal parts that decreases friction, wear and power consumption.

ESPECIALLY RECOMMENDED FOR

Ball Bearings, Chain Drives, Loom Gears and Cams, Foster and Universal Winder Cams, Comber Rollers and Cams, Slasher Bearings, Picker Bearings and Compound Gears, Pumps, and Elevators.

Packed in barrels, half barrels, and 50-lb. cans.

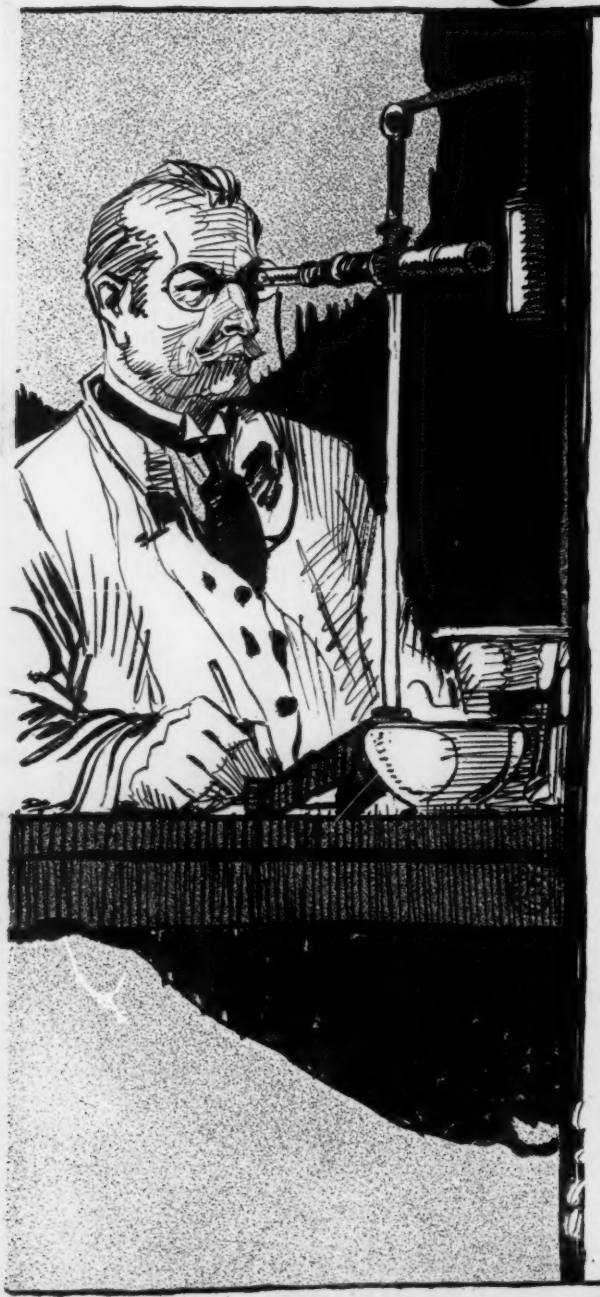
ECONOMICAL EFFICIENT SAFE

D-A Lubricant Company, Inc.

Indianapolis, Ind.

Southern Representative : : : : : : John K. Gewinner, 33 Luckie St., Atlanta, Ga.
New England Representative : : : : : MacNichol-Crosby Co., Little Bldg., Boston, Mass.

The Test Method in Buying Circulation



Not bulk alone, but heat units, is what the scientific coal buyer demands.

The same problem confronts you when you begin to buy white space.

In addition to net paid circulation you want to know about where the publication circulates; what is paid for it; how its readers regard it; the purchasing power of its readers; and its influence.

Audit Bureau Circulation Reports give you most of this information in carefully audited figures and statements. That is why a study of A. B. C. reports pays.

If you take the Publisher's Statement, the Auditor's Report and a copy of the publication and examine them thoroughly, you'll find that space buying is simplified, because the information contained in A. B. C. reports is accurate and informative.

You get a mental picture of the publication, its subscribers, and the people it serves.

The safest and sanest test when you are thinking of buying white space.

COTTON is a member of the A.B.C. We welcome comparison of circulation facts. We are glad to supply Publishers' Statements or Audit Reports upon request.

Audit Bureau of Circulations

202 South State Street Chicago • 347 Fifth Avenue New York

No man is big enough to sing a duet

YOU are in charge of certain machinery. And because that's your job, you know more about it than anyone else. But you simply cannot know thoroughly ALL the fundamentals of EVERY branch of your work—no man can.

Take the lubrication of that machinery, for instance. You know that end of it pretty well.

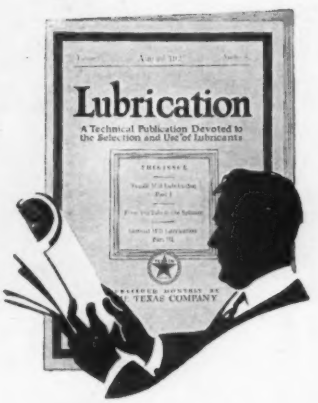
But can you possibly know it as well as a group of men who have spent years in perfecting their knowledge of this highly specialized branch of engineering science? And mark you, we say a group because "no man can sing a duet." And so when a Texaco Lubrication Engineer makes a recommendation as regards the kind or quantity of lubricating oil to use, he is not speaking only with the authority of his own experience, for back of him is the collective experience of a group of men who have been testing and observing lubricants on every type of power unit or machine in the country—in fact, all over the world.

So, if you have any lubrication problem—and every mill has them once in a while—talk to our engineers about the matter. Or write us.

Most careful attention will be given to any communication of this nature and we know that we can furnish a prompt and satisfactory solution to any problem relating to the selection of lubricants for any purpose. Do not hesitate to call on us. That is what we are here for.

And Remember:

THERE IS A TEXACO LUBRICANT FOR EVERY PURPOSE.



Are you receiving "Lubrication" each month?

"Lubrication" is our monthly magazine in which we print articles covering the problems of lubrication as applied to various industries. These articles are based on practical operating experience. We send it free to all interested in the subject of lubrication.

Clip This Coupon

THE TEXAS COMPANY
PETROLEUM and its PRODUCTS
Dept. O, 17 Battery Place, New York City
New York Houston Chicago

Offices in principal cities.

Kindly put my name on the mailing list for "Lubrication."

Name ---------- *Street* ----------

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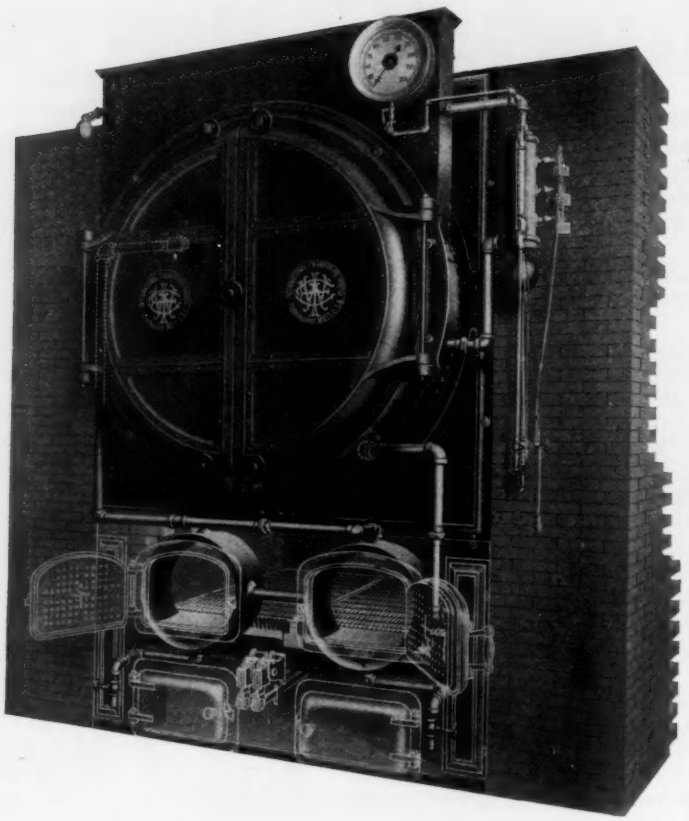
12-21

SMITH DOOR PROTECTORS

PATENTED



Instead of cast iron check plates' arches and dead plates for your Return Tubular Boiler Setting, be sure to replace with

SMITH DOOR PROTECTORS

Circular shape with a sediment chamber below the dead plate, provided with a Blow-off.

Hollow semi-oval cross section insures ample flare for easy access to all parts of the fire.

A continuing water circulation from the boiler through the protectors keeps the surrounding brickwork cool, the intense heat of the fire from warping the fronts, giving greater comfort in working the fire, which allows more careful attention.

A necessity for any return tubular boiler, low in price, and easy to install.

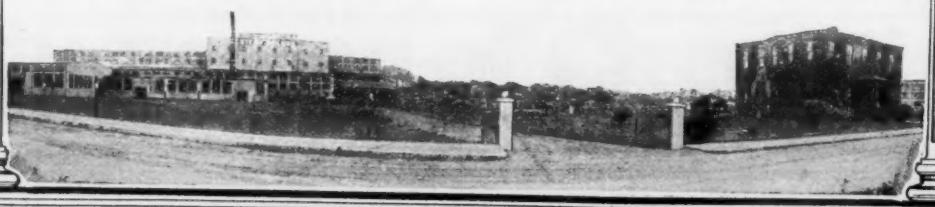
Ask for bulletins on: Horizontal Return Tubular, Vertical, Water Tube, Brady Scotch, Boilers, and McDonald Shaking Grates

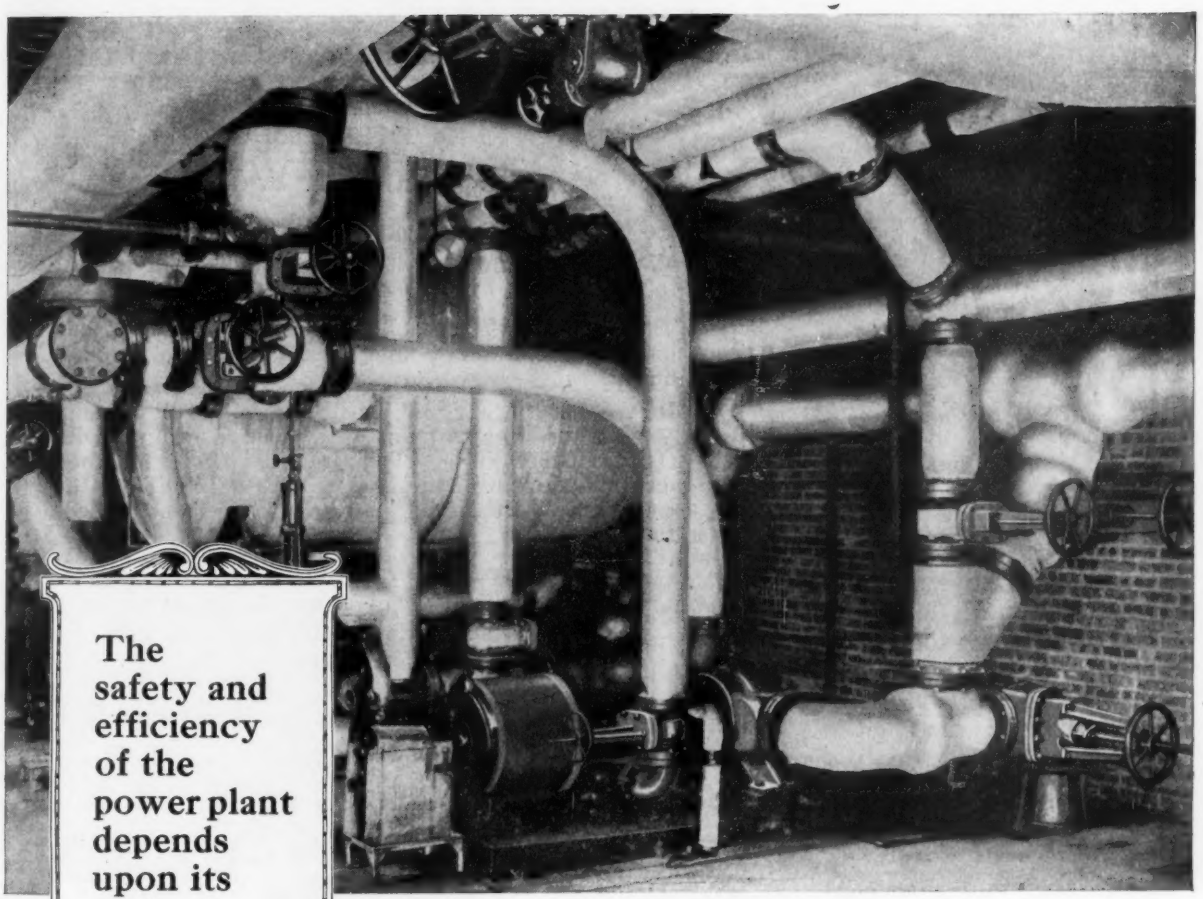
INTERNATIONAL ENGINEERING WORKS, Inc.
FRAMINGHAM, MASS.

Southern Representative,
Isaac Hardeman, Charlotte, N. C.

BOSTON
PHILADELPHIA

NEW YORK
SAN FRANCISCO





The safety and efficiency of the power plant depends upon its piping equipment.

CRANE
Power Plant Piping Equipment

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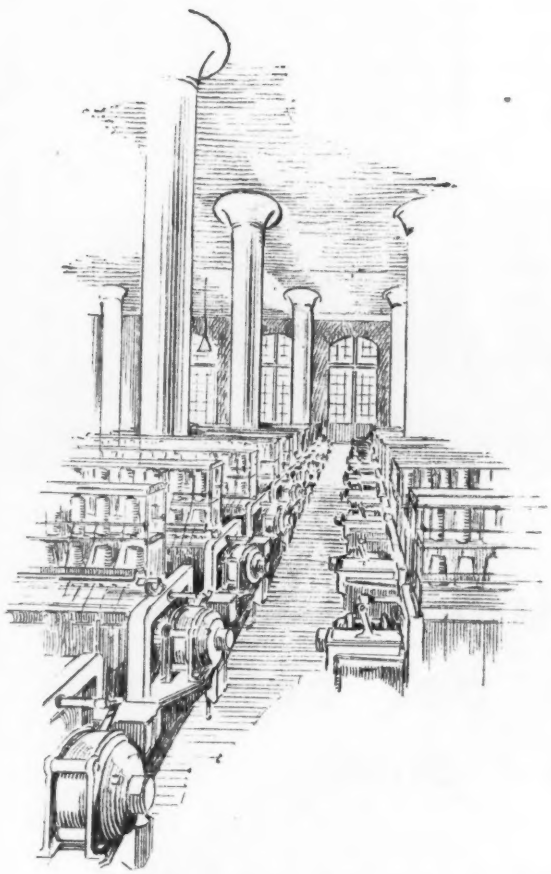

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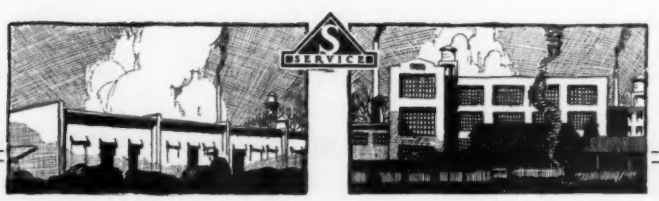

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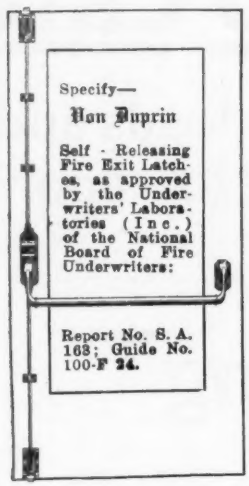
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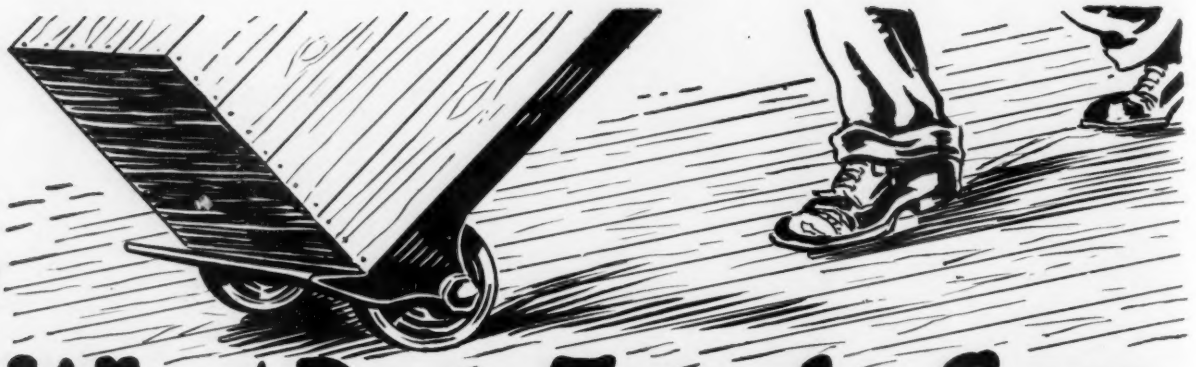

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"Among Those Present" When Test Showed Hyatt Bearing Looms Save 23.4% Power

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With the Publishers—

JOSEPH A. HOLLAND.

Let Us Take for Our Text Today
"Industrial Barnacles."

One of the definitions for a "barnacle" as given by Webster is, "One who persistently sticks to another, especially to his hindrance or disadvantage."

Unfortunately the industrial world has had a more or less continuous experience with this type of excess baggage for a number of years and, like the zoological barnacles that attach themselves to the bottom of a ship, they not only reduce the speed and efficiency but if one group is scraped off another group quickly replaces it.

But conditions have changed radically since those 1919-1920 days of unlimited work and limited workers. The woods are full of the "yesterday-I-was-a-daisy" boys and the barnacle scraper is a reasonably busy individual. Therefore, the Editorial Department has been particularly fortunate in securing Mr. Joseph A. Holland, managing director of the Industrial and Mercantile Service, Inc., to discuss this question on another page of COTTON under the caption, "Industrial Barnacles as Breeders of Discontent."

Mr. Holland is one of the pioneers in this line of endeavor, having had fifteen years actual experience with such organizations as the General Electric Company, Remington Arms, American Sugar Refining Co., etc. He has written and lectured extensively on industrial employment and welfare problems and is an accepted authority through the experience obtained in a broad and diversified practice.

Feed From a Revolving Table.

Do you remember reading not long ago about the revolving table that Thomas A. Edison fixed up for the camping trip—the trip that included President Harding, Henry Ford, H. S. Firestone and Mr. Edison?

This table, as you may recall, had a raised circular platform in the center upon which the food was placed. Whenever any of the party wanted a particular food they didn't have to bother anybody else. They just gave this revolving platform a little turn which brought the food around to them and they helped themselves. There was all the food spread out before them and they didn't have to take what came in courses—they selected what they wanted most. Not a single "Please pass the butter" was necessary.

Mr. Edison uses the same principle in getting food for thought. He wants to know what the leaders in science and industry are doing and to keep up with all the developments in those fields—especially those that can be applied to his work. So he uses the trade papers as a revolving table. There he has the latest and most important information spread out before him and can bring to himself that which appeals to him as good for him to digest. In his interview upon his seventy-fourth birthday anniversary he said trade papers were among his favorite reading materials which he reads Sundays and nights.

Such a table is especially adapted to building up a healthy cotton manufacturing industry. Not every concern needs the same kind of nourishment to make it thrive. Some are slim because they do not get enough production- increasing ideas. Others are growing weak for lack of proper equipment. Still others are in need of a diet that includes more marketing studies. Some turn pale at the sight of dyeing problems. Many grow dangerously heavy when excessive costs turn into unhealthy business fat. Therefore the mental food for men in the cotton manufacturing field must be carefully chosen for its health-giving qualities.

COTTON confidently invites textile men to sit at its table. Each will find some appetizing article or meaty advertisement that has an especial appeal and can be easily assimilated. You will find spread out before you—and well prepared for your consumption—plans that have nourished other concerns which were bothered by production, marketing, weaving, dyeing, knitting, finishing, equipment, transportation, costs and other problems.

All you have to do is to look over the spread COTTON offers each month and bring around to you that which is most appealing.

It is Easy to Accumulate Knowledge.

F. Gordon Cobb, the father of the sectional meeting and practical discussion idea, says: "If we mill men could fully realize the importance of profiting by the other fellow's experiences, such magazines as COTTON would not only be more closely read and studied but would be indexed and retained to build up a library of practical experiences."

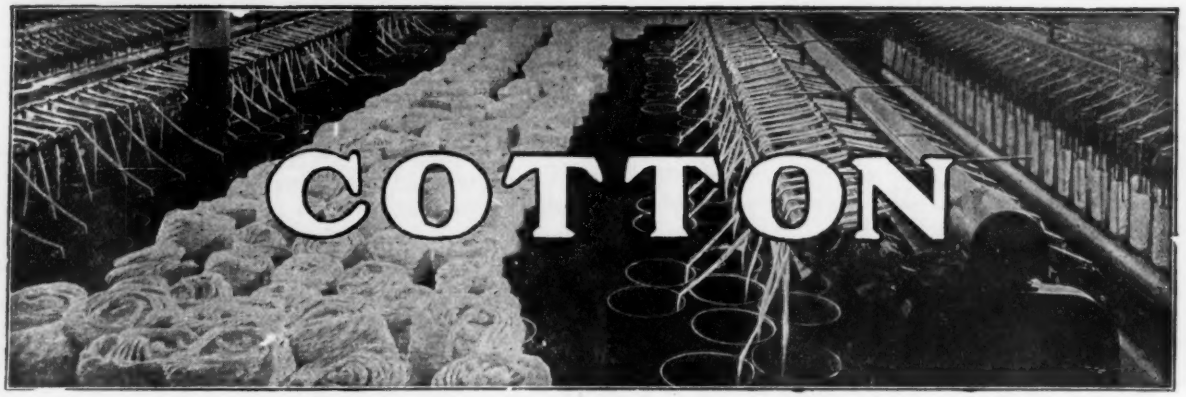
This isn't a difficult thing to do and several methods have been adopted by men interested in collecting and preserving the information published pertaining to their trade. The most complete way is to bind the reading pages entire by volumes. However, some prefer to remove what they desire to preserve and index by subjects in a loose leaf binder. The Editors will be glad to hear from men who have developed what is for them the most convenient system for reference purposes.

AMONG COTTON'S READERS

R. A. MORGAN, Agent,
Maginnis Cotton Mills,
New Orleans, La.

"I have been a regular reader of COTTON for many years, and have always found it to fill a peculiar place in the literature bearing on textile subjects. The broad and diversified field is well covered and interestingly presented. I am proud to know it is a Southern paper."

R. A. Morgan



December, Nineteen-Twenty-One

But What, As Yet, We Know Not.

A year ago the business men of the country were admonished to "watch Washington." A stirring political campaign had come to an end; a new administration had been elected. Apart from the international aspects of the election, the country had been promised that there would be a readjustment of the heavy tax burden of the United States.

Under the stress of war, this tax burden had been piled on in uneven masses to bring into the treasury the largest possible return. It was the policy of the government to raise as much money as could be raised by taxation instead of carrying the burden of the war upon the shoulders of future generations by the issue of bonds. True enough, billions of bonds were issued and their interest payments are a part of each year's outlay now. But to a far greater extent than many European countries, the United States government attempted to raise the war expenditures by immediate taxation.

The result of the heavy tax bills, with their inevitable inequalities, proved a serious handicap on the business of peace. During war time these differences were wiped out by the general pressure for unlimited production and the inflated values that made taxes but a small part of business expense.

The advent of peace ended this. Competition became keener, war industries disappeared, foreign rivalry for the markets of the world made taxes a vital question in the costs of production.

So the business of the country awaited with anxious interest the promised revision of its tax burdens. Now a year has passed, and those revisions are not yet in effect. The tariff revision, which was to be a corollary to the readjustment of internal taxes, has made but little progress in the eight months during which the new Congress has been in session at Washington.

There are many explanations for this, some of them political, others economic and still others international. On the political side the delay in tax and tariff revision is blamed at Washington upon a lack of vigorous leadership in the two Houses. This is not written by way of criticism of the Republican party. It is merely a reflection of the Washington dispatches which have told, during the last ten months, of delay incident to the difficulty of getting the members of each House, and then the majority of both Houses, to agree on vital questions. With vigorous leadership, the overwhelming majority which the Republican party has in both Houses, should have been able to operate with far greater expedition. Failing in an aggressive leadership in either House, the experience of other administrations has emphasized the value of a firm leadership in the White House. Presidents Roosevelt and Wilson took matters into their own hands at many critical stages. The former did so over the heads of fairly autocratic leaders such as Aldrich and Cannon. Mr. Wilson took the reins into his hands because the Democratic leadership of both Houses, during his administration, was often not sufficiently aggressive to keep the wheels of legislation moving at the necessary speed.

Momentum is necessary in legislative machinery as well as everywhere else. Once the wheels are allowed to stop, it takes a lot of force to put them into motion again. That is where leadership comes in. That is where both the House of Representatives and the Senate have found their difficulties during the present Congress. Again and again there has been a slackening of speed, a let-down of momentum, an apparent listlessness that allowed filibusters and even minor obstacles to impede the progress of important bills. In some cases there have been months of delay which a firm hand could have avoided if it had grasped the throttle in time.

President Harding has been unwilling to take this serious responsibility. So far as possible he has left to the Republican leaders in both Houses the shaping of party programs and the straightening out of legislative difficulties. So far as the membership in both Houses is concerned there have been plenty of indications that they would have preferred a little more control from the White House. In their public utterances, Representatives and Senators alike, find much satisfaction in proclaiming their independence of executive authority. They like to assert the freedom from White House domination; they point with pride to the great powers which the Constitution has conferred upon the Congress. But they also realize that their records will be measured in the end, not by their independence of the White House, but by their success in passing the legislation which the country demands. However much they may protest in public, they are likely to pray in private for enough executive guidance to let them return to their constituents with a record of actual accomplishment.

The delays which blocked the smooth progress of the Internal Revenue bill in both Houses came from a host

of sources. It was no easy task to write a bill which would lighten the heavy loads which the war had imposed upon large fortunes and profitable industries. The argument that the continuation of such burdens was driving money from industrial investment into tax-exempt bonds and that a high tax on industry could result only in lessening production and therefore decreased employment, fell on many deaf ears.

Even now it is impossible to say whether the final results will make possible a normal peace time industrial rehabilitation or whether there must still be further revisions and newer tax bills before the financial machinery can be said finally to have been readjusted. One thing is still promised; that is that the new year will see another effort to put a sales tax into operation in the United States in place of the present complicated system of varied internal taxes.

The tariff bill is still in the future. The House measure passed early in the fall still reposes in the hands of the Senate. The fight over the American valuation plan threatens all kinds of difficulties. But the real obstacle which has caused most of the delay and will continue to do so, is the almost insurmountable difficulty of trying to adjust a customs system to the chaotic conditions of European exchange. No scheme that has yet been devised can meet the feverish fluctuations in European currency. And if perchance some device is discovered that seems for the moment to offer some protection to American industry against the competition of a country whose government subsidizes its industry and whose exchange rate debases its prices, it is quickly discovered that such a measure threatens irrevocable injury to commerce with some other and more stable country.

That is why the country should not be surprised if it takes the remaining winter months and even some of the months of spring to put a new tariff law upon the statute books. Economic conditions throughout the world are but little more stable than they have been during the past twelve months. The progress towards stability is still most questionable. The difficulty of attempting to fit a law to all the intricate differences in production costs and exchange rates has not been lessened. As a result, it is likely that many of the leaders, in both Houses, will prefer to have the final passage of a new bill postponed, rather than to take a chance on the passage of a bill which the unstable conditions of the world will make just as unsatisfactory as the existing statute.

A Survey of Current Business.

One of the first big things considered by Herbert Hoover after becoming Secretary of Commerce was how could business be stabilized. He had seen industry after industry slip from the high peak of inflation that followed the war into the deep sinks of depression that were so noticeable in 1920. With his analytic mind he quickly realized that if it were possible to outline an accurate bird's-eye picture of the changing conditions in the several basic industries of the country and present this picture to the business men of America promptly enough, these changes could be discounted and industry stabilized.

With this thought in mind he discussed the proposition in detail at his monthly meetings with the National Conference of Business Paper Editors and at his conferences with the representatives of the associations of the basic industries involved. These efforts resulted in a preliminary survey distributed on June 20th in multigraphed form and containing index numbers of interest on several industries.

From this first attempt was evolved the second survey with a number of improvements in the form of charts and increased sources for figures. This publication is called the "Survey of Current Business" and the third number showing conditions as of October 1st, 1921, was distributed early in November. It contains several changes in the form of the tables and also a number of additional items. Information from a number of trade associations are included for the first time greatly increasing the value of the publication in these lines. It is believed that all such associations will gradually recognize the advantage both to themselves and to business in general of having the significant trends of their industries made public in this manner. With a proper cooperative spirit from these sources, the results will become still more valuable in the surveys of the future.

The most important feature to a manufacturer, outside of the detailed tables concerning his own business, is the general summary which occupies the first seven pages of the current "Survey." This summary is designed to show the trend in important industrial and commercial movements. The first column shows the year used as a base in computing the index numbers. The second column indicates the per cent of increase or decrease of the latest available index number as compared with the base year. The third column contains the comparison of the current month with the corresponding month of last year.

In all instances where statistics have been collected over a long period, the pre-war year of 1913 has been selected as a base, or in some instances the five year average, 1909-1913. In other instances, where the gathering of statistics began at a more recent date, a more recent base has necessarily been selected. But in each instance the base is given and as the comparatives accumulate the picture becomes more and more authentic and valuable.

As a concrete example of one of the more recent industries to accumulate statistics, let us select automobile tires and accessories. The complete tables are given on pages 18 and 19 but the summary shows that with the six months average of November, 1920, to April, 1921, as a base, the production of pneumatic tires for September had increased 111 per cent; solid tires, 61 per cent; and inner tubes, 227 per cent. September also showed an increase in domestic shipments as follows: pneumatic tires, 62 per cent; solid tires, 37 per cent; and inner tubes, 94 per cent. Stocks, on the other hand, in spite of the increased production, showed a decrease as follows: pneumatic tires, 35 per cent; solid tires, 45 per cent; and inner tubes, 30 per cent.

Automobile accessories in September, using January, 1921, as a base, showed an increase in purchases amounting to 273 per cent, while during the same period accounts past due had decreased 46 per cent and notes outstanding had decreased 20 per cent.

The foregoing brief notes give a clear picture of that section of the automotive industry and indicate plainly the

(*Continued on page 74.*)

Industrial Barnacles as Breeders of Discontent. Will We Exterminate the Germ?

BY JOSEPH A. HOLLAND,

PERSONNEL DIRECTOR, UNITED AUTO STORES, INC.

The abnormal number of strikes, calamities, the many cases of dissension and disagreement that exist between unions and the firms who employ its members, (and in many cases this dissatisfaction even permeates the labor unions themselves), all present to our minds a gruesome mental picture that causes even the disinterested person to gasp and wonder how long this state of chaos will continue and why a happy solution cannot be reached. When a condition of conflict prevails between employers and employees, the direct opposing forces are by no means the sufferers in the extreme. The non-combatants, the merchants in the community, the public at large, are all innocent victims of the brunt of battle.

Are we not going to solve a way to teach our people not to be swayed by the arrogant disturber, the person whose sole livelihood depends on his tact in causing discord and strife to prevail, this person who is so obsessed with his ability to persuade by his fluent gift of gab the associates and colleagues whom he more often exploits than assists? Can we not show our workmen that the dastardly deeds committed under the cloak of so-called "peaceful persuasion," these very crimes oftimes urged by this same disturbing element, will only retard the progress of their cause, arouse public animosity and dispel any feeling of sympathy that is warranted in some specific cases?

No sane person will deny but that some strikes were justifiable in the past, but we are now becoming modernized. A strike should now become the discarded and obsolete weapon of commercial difficulties and should be put on the shelf as an antique. Let us class it with other antidiluvian methods of torture, for torture it is to all concerned, directly or otherwise.

The universal question is, "How can this change be brought about?"

Let us delve into the problem, dissect it, probe it and look on both sides of the fence, forgetting for a moment our personal opinions and convictions. Let us have cold, candid facts from an unprejudiced point of view. First do labor unions cause a marked degree of betterment for their members? The learned students of social and economic conditions state that, as a rule, much good has been accomplished toward improving sanitary and working conditions, and shortening of hours for employees, particularly women and children. Allowing labor unions their full share of credit in this respect, we must not lose sight of the fact that public opinion, fostered by the press, clergy and laymen, was the real instrument which caused the enactment of such laws, or which changed the viewpoint of many manufacturers to the distinctive benefit of the laboring classes. That is what we want; more intelligent understanding, more intelligent laws, not strikes. A equitable law equalizes and promotes competition. Strikes stifle competition. And in most cases where an employer is forced to concede to collective demands, he simply is accorded the privilege of furnishing the funds for the payroll while his bank account may last.

The question is often asked, "Why is it that some labor unions seem to retain amiable and harmonious relations with the employers of their crafts, while others are constantly wrangling, ever involved in disputes and grievances?" A thorough investigation and study clearly shows us that such unions as are organized with a sincere purpose of promoting the interest of their fellow-workmen, are careful to devise and adopt a constitution and set of by-laws that show a deliberation of cool conservative heads, and when said unions adhere to and rigidly enforce the rule pertaining to the admittance of the prospective members relative to their mechanical equality and efficiency, they will then have established a standard of skill that will at least invite an investigation and perhaps bring about a happy solution of any grievance that may arise, if, of course, the representatives of the union in question, are legally responsible and show a business-like conception of the employer's interests also.

To confirm these statements, the records of industrial statistics show us that an extremely small percentage of labor troubles arise from unions conducted on a basis whereby they confine their membership to those who show a marked degree of skill in their particular craft. Since that is so, does it not follow that when employees are corralled and herded together without any attempt whatsoever to weed out the incompetent from the skilled, that the employer cannot and should not tolerate or countenance any such condition?

It is ridiculous to consider a collective demand proposed by a union that is formulated and conducted in the latter manner, a union that is comprised of and includes anybody who is so fortunate as to possess the required initiation fee, regardless of their qualifications and experience. It is not a square deal to either the competent workman or his employers. While the laggard or incompetent workman may favor it, and well he may, it has been proved conclusively in case after case, that a concession granted on the part of any employer to a collective demand coming from this source, does more than any other one thing to diminish the desire for increased knowledge by the inferior workman.

It is indeed poor satisfaction to the mechanic who has devoted time and energy toward accumulating trade knowledge and skill, to be burdened by the yoke of carrying the inferior workman under his protecting wing, particularly as the incompetent is able to command, under union rules, a wage-rate that is the same as that of his more experienced colleague. Why, then, can we not reach this type of men and show them the folly of sacrificing lucrative and desirable positions, and oftimes homes, families, and future, simply to foster the slouch, who depends on the gang element of force for an easy existence. This second class of men do not even think for themselves, but simply link their destiny to the tentacles of the organizing octopus, that squeezes or relaxes as it so wills. It is a shame that more time or money is not devoted to education and en-

lightenment for this cause, so that real facts may be infused into our workers and thus dispel the erroneous impressions that have been created in their minds by the agitator, who is greatly overpaid with hard earned money, (not from his own labor, however).

It is really sorrowful to note the number of cases where the backbone of the jellyfish is displayed in men who are subject to the beck and call of these disruptionists, especially at a time when the conscience of these very men dictates to them to remain at their work and when, in general, their conditions are satisfactory. Usually they are fearful of the proverbial lead pipe or black-jack being playfully bounced off their heads by the "peaceful pickets," sometimes known as thugs.

Some of these statements may seem harsh. Perhaps so, but they are facts and truth is not always sugar-coated. There is no necessity of citing specific instances of dynamiting, murders, and other atrocities that occur from time to time as proof of these statements, as the truth is forcibly brought to our minds almost daily by current reports of the press.

There seems to be an overwhelming sentiment sweeping over the country just now to establish and maintain international peace forums and conferences. Men and women, well known in public life, are taking a keen interest in consummating plans for the prevention of international strife and all its horrors. Why then, don't these same people open their eyes to the industrial wars that are existing in our own country? Why don't they gather statistics that will show the loss of life, the millions of dollars in lost wages, the complete stagnation of many industries that is caused by this putrid condition of industrial affairs.

Why not link our moral and financial efforts together in a huge educational campaign. Let us up-lift our workers and tear off the blinders that have been placed before their eyes by the oratory and superfluous literature of the peace disturbers. Let us inculcate in them a positive feeling that all employers are not of an avaricious and grinding temperament. Let us dissolve the religion of hatred and malice that is being spread broadcast by the apostles of anarchy.

Right here, let me emphasize the fact that this proposed education should not be confined to the working class alone, as there is plenty of room for the broadening of the minds of the employers, some of whom are prone to be negligent and disinterested in the progress and betterment of those in their employ.

Some individual firms and, I am glad to add, some communities seem to be waking up from a dormant state, and are striving to do some concrete things that will establish perfect accord between employers and employees. Why not make the movement universal? By doing this, we can force the chronic dissenter to adopt an honest vocation or cease to exist, and at the same time shame the grasping, money-mad employer into following the footsteps of the fair-minded and square employer, the one who cherishes the respect of the multitudes.

Come out of your solemn shell, Reverend Sir, who would do real good, and instruct your flock.

Get under the spotlight, you, Mr. Legislator, by doing your share.

Unloosen your purse strings, Kind Philanthropist, and earn the blessing of all humanity.

Take up this subject, you, Mr. Lecturer. It is real meat to chew on.

Look around, you, Mr. Employer. Do your part.

And you, Mr. Labor Man, if you are sincere, now show it. Follow the parade.

Let all organizations of capital and labor sprinkle the seed in fertile ground that the fruit therefrom may be manifold.

A Survey of Current Business.

(*Continued from page* 72.)

method adopted in the "Survey" to present a summary of clear, concise facts.

An alphabetical index has now been added at the end of the "Survey" which will materially assist in its usefulness.

The "Survey" is not intended to predict the future, but to present the current trend of industrial movements with such comparatives with the past as may be possible from available records. With these facts set before him, the manufacturer and business man may make his own predictions as the trends presented may apply to his own particular business.

The monthly "Survey of Current Business" is compiled by the Bureau of Census, the Bureau of Foreign and Domestic Commerce, and the Bureau of Standards, all of which are a part of Secretary Hoover's Department of Commerce. The subscription price is $1.00 a year and remittances should be made only to the Superintendent of Documents, Washington, D. C., by postal money order, express order, or New York draft.

A New Book on Bleaching.

A new book containing a discussion of the important researches that have been reported during the period 1908 to 1920 and which bear on the bleaching industry with reference to the various constituents of textile fibers, etc., has just been published. Its title is "Bleaching," and the author is S. H. Higgins, M.Sc., a well known English writer on bleaching subjects, who is head of the research department of the Bleachers' Association, Ltd., of England.

The author explains that, in this work, it is not his purpose to attempt to give a complete account of the subject of bleaching; that any such attempt would end in failure. He says that this book is written for the practical man familiar with the subject, who has other books on bleaching, to which this work is intended to be a supplement. In a practical and theoretical manner, this book, the work of one of the more prominent authorities in the industry, presents a resume of the developments along research lines in the industry during the period mentioned, presenting a record of work as a basis for the further extension of research work in the industry.

The Book Department of COTTON will be glad to secure copies of this volume for any readers desiring them, or copies may be secured direct from the publishers, Longmans, Green & Co., Fourth Avenue and 30th Street, New York City. The price is $3.75 a copy.

Six Definite Things That Workers Want

2. A Hearing Higher Up.

BY JAMES H. COLLINS.

Looking ahead last summer, the management of a large eastern factory saw that, within six weeks, there must be a reduction of the work force. Ten per cent of its employees would have to be laid off—maybe twenty. Sales were falling, products accumulating in storage instead of going to customers, and in borrowing money to continue production, the company had about reached the limit.

Hard necessity, and bad news for many a wage earner, but a common enough story these times.

That factory is operated on John Leitch's plan of Industrial Democracy. It has a "cabinet" made up of its executive officers, a "senate" composed of managers and foremen, and a "house of representatives" elected by employees, one delegate to each thirty or forty people.

A mass meeting of employees was called together, and the president laid the situation before them. There could be no difference of opinion about the grim necessity for laying off some employees.

"You don't have to tell us that business is bad," said one employee-spokesman. "We read the newspapers, and know what's going on.'

"Well, then, we want you to advise the management in making this reduction," replied the president. "Tell us who you think ought to be laid off."

Every worker in that plant has a personal efficiency rating. Under the system, each employee has access to his own rating card, and knows exactly where he stands. Class A employees are the leaders in production, standing highest in quantity and quality of work, as well as in adaptability —they understand working methods in more than one department, can be shifted if necessary, and are capable of taking responsibility and supervision. Class B employees stand high in output and quality, but are less adaptable, being familiar chiefly with one task or department. Class C comprises all the employees who have failed to fully measure up to the standards and opportunities in a single department, sometimes lacking ambition, again conspicuous for careless work or slacking, and generally indifferent to improving their ratings.

"Now, let us consider making the cut in Class A," continued the speaker. "Largely upon the efficiency of A employees we have been able to turn out quality goods, maintain sales so far, and keep the plant running. The A fellows earn the highest wages. If we make the cut there, not so many of them will have to be dropped to balance our payroll. And they stand the best chance of finding new jobs elsewhere. More of the B employees would have to go, but not as many as C employees. The C employees would find it hardest to get new jobs outside. If we cut either A or B, however, the quality of our product might fall, and that would mean decreased sales, and probably further lay-offs later on if business doesn't improve. All those in favor of dropping A employees will vote by rising."

Not a single employee rose. Nor did anyone favor dropping class B workers. When the vote was taken on Class C, three-fourths of the employees were in favor of it.

"That is the way we voted in the cabinet," announced the president, "and we are glad to see that you take the same view, after considering all angles of the problem. But in the cabinet we voted unanimously. Does the minority here want to register its vote for some other plan?" Not a single employee rose or made a suggestion.

More and more, employees are being given a voice in the employer's policies that effect themselves. Hardly a week goes by without an announcement that some large corporation has adopted such a scheme of employee representation or "industrial democracy." Conservative business men are a little apprehensive about this tendency, interpreting it as an uncalled for and radical concession which may ultimately lead to a demand for employee representation in management-labor interests on the board of directors.

The most famous plan of the kind is that devised by John Leitch, which is patterned on our democratic system of government, and is designed to restore the man-to-man relation that existed when business conditions were smaller. As his ideal of this relation, Mr. Leitch tells a story of Phil D. Armour. Noticing one of his employees out in the mire of the old stockyards with leaky boots and thin coat, he gave him money to buy a warm, dry outfit, saying that he couldn't afford to have him get sick. That was autocratic business, with the personal relation. Business continued to be autocratic in management when it outgrew the personal relation, and the best remedy for the evils of autocracy is democracy, Leitch maintains. Under his plan, the executives of a business form a cabinet, the department heads and foreman a senate, and employees elect a house of representatives. The senate and house of representatives meet weekly. Any employee who has a suggestion, grievance or complaint brings it to the representative elected from his department, and it comes before the house. Matters affecting working conditions, hours, wages and the like are formulated in bills, hearings are held, and they become law or are rejected after debate, modification and vote.

At first sight, it might appear as though such concessions by management would turn an organization into a debating, fault-finding, time-wasting, interfering rabble. But actual experience with the Leitch plan in thirty or more diversified business organizations shows that it brings grievances to light, corrects them, decreases soldiering, increases efficiency, lowers production costs and improves quality. Incidentally, there seems to be no place for labor organizations in a business where such a plan is in operation, and thus far there has never been a strike in such a plant.

One of the key men in every organization, with broad possibilities for making trouble as well as avoiding it, is the foreman. Injustice by foremen, and soldiering or carelessness by workmen, can be brought to light under such a plan, investigated publicly, and corrected. One or two investigations of that sort make foremen and workers aware that nothing can be hidden or "put over." The fore-

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man becomes a leader instead of a boss, and his subordinates work under him in a new spirit.

Employers suddenly find themselves closer to employees, looking through their eyes at conditions that had been hidden from them, while employees get broad views of the problems with which the management deals. Yet if an employee democracy were to pass a bill increasing wages or shortening hours to an unreasonable extent, or go beyond lines of conservative management in any other way, the cabinet has power to veto a result under this plan. That working people are generally reasonable, even conservative, is shown in the striking fact that it has never been necessary to use this veto power. Employees find themselves closer to management, facing executive problems, and seeking solutions in their own work. Probably the most typical illustration of this is found in voluntary teamwork to eliminate waste and losses.

A story of the kind constantly cropping up was found recently in a New England textile plant. Some inspectors discovered a lot of stockings which had become slightly soiled, and were classable as "seconds." Peeling off their coats and rolling up their sleeves, they got busy and washed the whole lot, turning them into "firsts."

The worker wants a hearing because he has something to say—a complaint to be taken up or a suggestion of possible value. If no channels are provided for giving him a hearing, he can do one of two things—try to reach the management through an organization which will usually be hostile, or silently quit and find a job elsewhere. If he is given a hearing, and facilities for reaching people higher up at any time, it is not he alone who profits, but management as well. For again and again it has been demonstrated that what the worker has to say about things that affect himself is something that management can seldom afford to be ignorant about. The gain may be great to the fellow who wants to be heard. It will be greater to the fellow who listens.

[This is the second of a series of six articles by Mr. Collins. Others will appear later.]

National Association Convenes at Boston

The semi-annual meeting of the National Association of Cotton Manufacturers was held at the Copley Plaza Hotel on Wednesday and Thursday, November 2nd and 3rd, coincident with the International Textile Exposition. The attendance was numerous and the program was made up of subjects both timely and interesting. As usual at the Fall meetings, some time was given over to social functions and sports which were thoroughly enjoyed.

The First Session

was called to order by President Lowe in one of the ball rooms of the hotel at 2:30 o'clock on Wednesday afternoon. After the reading of the reports of the secretary and treasurer came the formal reports of the standing committees. The amendment to the constitution and by-laws providing for technical members and junior technical members was then taken up for discussion and adopted unanimously.

President Lowe then introduced Walter Camp, president of the American Valuation Association, as the first speaker, thus giving Mr. Camp an opportunity to present his views on the importance of American valuations as the basis of our forthcoming tariff legislation.

The next speaker on the program was Edward T. Pickard, chief of the Textile Division of the Bureau of Foreign and Domestic Commerce, who called attention to what has been done by Secretary Hoover to interest

Business in Government.

He outlined the changes that had been inaugurated in the Department of Commerce until it is now the great business arm of the Government. He assured those present that business men may now come to Washington with the knowledge that they would find some one at their disposal who understands the individual problems of each group.

Mr. Pickard then outlined the functions of the Textile Division and the general activities of the bureau as a whole, incidentally calling attention to the condition of the American textile industry as compared with the same industry abroad.

Speaking of German competition, Mr. Pickard pointed out that while in certain of their manufactures which do not require imported raw materials to any considerable extent they may, for a time, be able to put out goods at very low prices, there was no call for the fear that had been voiced in some quarters.

The speaker closed with some brief references to the conditions obtaining in Great Britain and France and some comments on the developments in our own export trade.

Following Mr. Pickard's address was a talk by F. R. McGowan, chief of the Textile Section of the Bureau of Standards, on the

Standardization of Textiles.

Mr. McGowan began by outlining the history and purposes of the bureau and especially of the Textile Section. He pointed out that standardization was of four types—quality, measurements, performance, and of a variety of constants. He emphasized the need of cooperation on the part of all concerned and outlined the efforts of the organization to standardize cotton duck specifications so that the demands of the purchasing agents of the several government departments would be recognized as commercial and not special specifications by the manufacturers, who would then be able to fill such orders from stock, giving quicker delivery at a lower cost.

Taking up the testing work of the section more in detail, Mr. McGowan told of some of the crimp tests now being carried on in reference to tire fabrics, for example, which indicated definite reasons why a cord tire should last longer than a fabric tire. Continuing further, he said, "We find that some of the theories and practice of the present day in regard to certain properties of a single yarn as against a two-ply yarn are misleading and in some cases incorrect. Comparing a 10s single soft and hard twisted and a two-ply 20s soft and hard twisted, we find from our tear test, using four yarns of similar count, that the 10-ply hard twisted gives a greater tear resistance for the same construction and conditions than is usually expected in two-ply yarns. Using the same yarns and the same construction with a large amount of crimp and a small

amount of crimp, the incipient failure test at 95 per cent of the breaking load shows tentatively that a fabric with the small amount of crimp gives greater serviceability than a fabric with the large amount of crimp. This fact is now being considered in the development of balloon fabrics. We find in balloon fabrics that we have an unbalanced proportion of crimp in the warp and filling. We find that requirements of balloon fabrics are that both sets of threads should carry an equal load in order that the weight of the balloon covering may be reduced. In actual service the present fabrics, as in most unbalanced fabrics, have one set of threads doing most of the work and in some cases all of the work; and the fabric is only as strong as that direction in which the lesser amount of strength can be found, considering that the yarns in warp and filling are equal. This is an instance where scientific research will result in a large improvement and saving, although in the beginning of the experiment we did not know just what we were striving for or that we were going to deal with such a fabric as balloon fabric."

Mr. McGowan then discussed the classification of textile materials, finally going into the laboratory phase of standardization, including the preparation of specifications and the allowable tolerances, and concluding with an enumeration of the chief functions of standardization.

President Lowe then introduced James Sinclair, chairman of the association committee on

Production Costs

who took charge of the meeting and called as the next speaker Ralph E. Loper of Fall River, whose address on cost methods and some of the discussion thereon will be found on another page of this number.

The final speaker at this session was Robert E. Naumburg, M. E., of the Saco-Lowell Shops, who discussed the evolution of the spooler tension device, his paper being illustrated with lantern slides.

The Second Session

was a social event held on Wednesday evening in the ballroom at the Copley Plaza in honor of the ladies. It began with a concert at 9:00 o'clock by a quartette from the First Baptist Church of Boston. This was followed by an informal dinner dance under the direction of Charles H. Ely, chairman of the Committee on Entertainment. Tables were spread along the sides of the room, the center being reserved for dancing.

The Third Session

was presided over by President Lowe and resumed its deliberations at 10:00 o'clock on Thursday morning. The report of the resolutions committee was read and adopted, and as there was no further business the meeting was turned over to Chairman F. W. Reynolds of the committee on research.

Addresses were made by Robert Amory of Boston who spoke on "Research in This Country," and by F. S. Blanchard of Boston who told of "British Research and the Proposed International Cotton Research Committee."

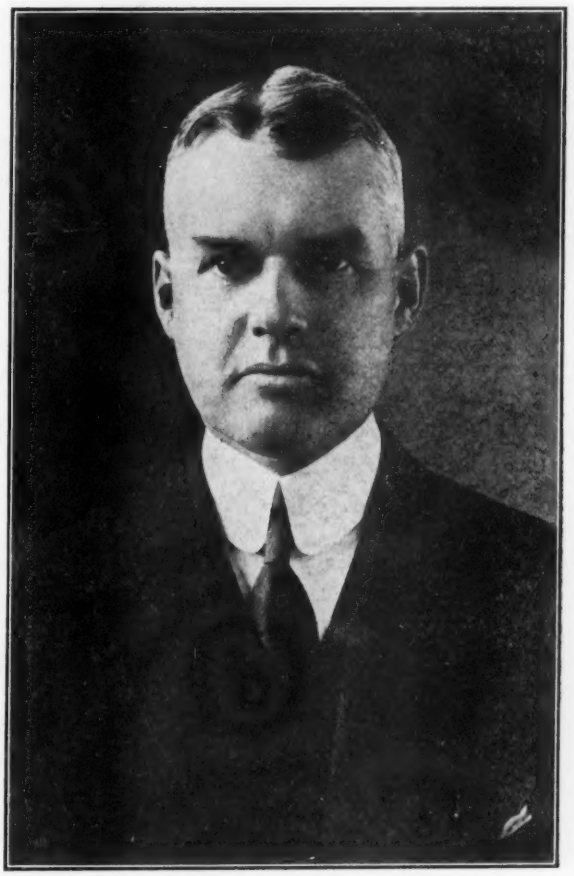
A letter from John Bancroft of the National Association of Finishers of Cotton Fabrics was then read. This association favors the formation of a bureau of research to be supported jointly by the several associations. H. E. Howe of the National Research Council also spoke briefly in favor of the movement.

Following this discussion came some short talks on the foreign industrial situation by W. Irving Bullard, the treasurer of the Association, who had visited 13 countries while abroad; Albert Greene Duncan, who was a delegate to the World Cotton Conference; Edwin H. Marble, of Curtis & Marble Machine Co., Worcester, Mass., also a delegate to the conference; and Sidney B. Paine of the General Electric Company.

Thursday afternoon those who desired played golf at the Belmont Spring Country Club.

The Banquet

which constituted the fourth session of the association, was held in the ball room of the hotel at 7:30 o'clock on Thursday night, and was well attended. President Lowe presided and before presenting James A. Campbell, president of the Youngstown Sheet and Tube Co., of Youngstown, Ohio, the speaker of the evening, he presented his semi-annual address, speaking in part as follows:



PRESIDENT RUSSELL B. LOWE.

President's Address.

Since our spring meeting our industry has traveled the path of other lines of industry, through deflation, uncertainty, worry and loss, and progress to better times has been slow. In April we were hopeful of a speedy clearing up of our legislative problems, taxation, the tariff, and other business uncertainties.

Unfortunately, these problems are still before the business man, and Congress takes its time in carrying out the program of the Administration. This country is not dependent on other countries for prosperity, and constructive

legislative work last summer would have greatly relieved unemployment this winter.

The foreign situations bring in so many new angles to the tariff question, that the representatives elected on a protective tariff platform seem unable to carry into effect their promises. England's Safeguarding of Industries Act went into effect October 1 and is a tariff for industries needing it. In the meantime, more cotton goods are coming in, and to that extent our labor and mills are idle.

Employment is greatest in those countries where wages are low, and unemployment the most where labor is highly paid. The United States shows the largest number of unemployed and Germany the least. France and Belgium with their lower wages are better employed than England. England exports three-fourths of its cotton goods to India, China, Africa and the poorer countries. These countries have had all they could do to feed themselves. Cotton goods have been so high that they could not buy. This has closed the English mills and caused great unemployment. Business will not be normal until these countries are buying freely. In the meantime, the finest market in the world is the United States, and all the European countries would like to get it.

The United States has large debts and big expenses. Therefore, we must run our industries and employ our American labor, in order that business may pay these debts by taxes. This can only be done by a tariff which will protect the United States market for the American laborer and manufacturer. Cancel the debts if need be, but give employment before anything else to American labor.

The railroads, according to statements printed recently, have capital invested of sixteen billion. This compares with twenty-two billion in manufacturing. The purchasing power of the railroads, which may be estimated at forty per cent of the total, has been restricted for such a long period that it has been a large factor in holding up normal business. If the railroads become purchasers in the near future, they will help materially to start business.

Foreign rates are too high, caused principally by the high railroad labor costs. The rates cannot come down until labor does. It would undoubtedly be a benefit to the economic situation if railroad income was increased to a point where they became purchasers, and gave employment to the machine shops and steel mills now awaiting orders. Purchasing power is the method by which business will return to normal.

The supply of raw cotton is a serious matter. It is estimated that over two hundred million dollars worth of cotton was destroyed by the boll weevil. The boll weevil, contrary to expectations, on which it was figured that after an area was attacked it would not be again attacked, is now prevalent from Texas to the northern boundary of the cotton belt, and is about as bad in one place as in another.

The present cotton crop, if all the spindles in the world were operating, would not be sufficient to keep them going until the next crop, and a serious feature is that there is a possibility that the crop may be even smaller in future years, because of the boll weevil. It can be easily seen that a crop disaster would be a serious thing for the cotton manufacturer and employees. The National Council is working on plans which we are hopeful may be of some benefit in finding a method of eradicating the boll weevil.

The whole textile industry faces too much uncertainty in regard to the purchase of cotton. The price fluctuates to such an extent that the manufacturer cannot plan his work, nor can the garment manufacturer be certain of any price on which to base his product. There are few industries, if any, in which such a speculative feature is present.

On the present condition of cotton, the buyer and the ultimate consumer must not be surprised if cotton prices are higher. This is contrary to the statement of most students, who say that every commodity must be lower during the coming year, but the condition of the cotton crop makes the opposite necessary, and we manufacturers can only hope that the consuming public will recognize this exception to the general line of prices.

Looking into the future, the general opinion is that the cotton industry is headed for prosperity with a shortage of production when demand becomes normal. The forty-eight hour week meant a curtailment of twelve per cent. This, with the curtailment in production, means an enormous shortage of goods. The whole economic situation is improving. The textile industry will improve as fast or faster than the majority of industries.

Business sentiment is improving steadily. Copper and oil have advanced. Railroad conditions, measured by earnings and car loadings, are better. Unemployment has decreased. Money is easier. Liberty bonds are up seven per cent from their low point. The reserve of the Federal Reserve System is steadily rising, and the discount rates are at five per cent in our districts. All of these things are good signs, and they point to but one conclusion, which is full time and good business. Some economic fallacies are still to be found, such as the curtailment of production in order to maintain high prices, but small production is not constructive, and does not increase wealth.

Hope, which would place the economic condition of the world years in advance if it materializes successfully, exists in large measure. It is exemplified in the Congress for Limitation of Armament meeting in Washington in a few days. If this can be carried out, the nations of Europe, who are struggling under such economic difficulties, can easily pay their debts. Our own debts would be paid, and taxes made lighter. This promises to be one of the events in the economic world's history of the present and future, and let us hope that it accomplishes the purpose that President Harding wishes for.

The note which I would leave is one of hopefulness and a feeling that the textile industry will steadily improve, and will emerge from its difficulties as quickly and with as little loss to its capital investment and as little unemployment for its labor as any leading industry.

At the conclusion of his remarks President Lowe then introduced Mr. Campbell who spoke on

Transportation.

His remarks follow in part:

While transportation by rail is of great importance in every section of the country, it affects some sections and some industries more than others, and manufacturers whose products are lighter in weight and whose shipments are smaller in volume and greater in value per ton, may not have given it the same attention as those whose tonnages are larger, and whose interests are more vitally affected.

In the steel industry, the mining industry, and especially

the farming industry, tonnages handled by rail are enormous, and practically all shipments must be made over the railroads. In the New England states, where the textile industry predominates, and transportation by water is available, especially for fuel and raw materials, the question of railroad freight rates is not likely to occupy the public mind so insistently as in other parts of the country.

In spite of the fact that the textile industry and the factories of New England generally may make less demands upon rail transportation than are made by agriculture, mining or the manufacture of steel, efficient and economical operation of the railroads is of great importance to your section. Without this, general prosperity will be impossible under ordinary conditions, and your markets will be curtailed by the inability of the public to purchase your products. For this reason you will be interested in the facts concerning the present railroad situation.

Mr. Campbell then sketched the history of the railroad situation from the time of the formation of the Interstate Commerce Commission down to the time the railroads were taken over by the Government and the establishing of the "National Agreements" by the Director General of Railroads.

Immediately following this action by the Director General, the men in the shops, those employed in maintenance of way, the clerical forces, and other employees previously unorganized were formed into unions under a department of the American Federation of Labor, many new classifications being created and the line sharply drawn as to work to be performed by members of any of the shop crafts. The piece-work system was abolished, and the eight-hour day, with time and one-half for overtime, was established in every department, without regard to the cost or inconvenience involved. Many other vexatious and expensive rules were enforced, all of which served to increase the wages and decrease the efficiency of workmen.

One of the results of this action by the Director General of Railroads was the deficit of more than a billion dollars accumulated under government operation, which the government, or rather the people of this country, will have to pay. Further, many of the railroads complain that their properties were returned to them, at the end of the period of government control, in very bad condition, with tracks, rolling stock and other equipment in need of repair. It should be borne in mind that, during the period of government control, freight rates were advanced twice, the first advance being 15 per cent and the second 25 per cent. It is interesting to note, also, that during this period the expense of operating the railroads rose to 119 per cent of their revenues.

The railroads were operated under government control for twenty-three months and were returned to their owners by an Act, known as the Transportation Act, approved February 28, 1920. This Act provided for the cessation of government control on March 31, 1920. It also provided that in the future all disputes between employees and management should be referred to the Railroad Labor Board, a new governmental agency created by the Act and endowed with some of the functions of a court in such disputes. The Transportation Act also provided that no change in rates of fare, freight rates, or practices affecting the transportation of freight should be made before September 1, 1920, and that no changes in transportation charges should be made after the latter date without the approval of the Interstate Commerce Commission. Provision was also made for funding by the railroads for a period of ten years their indebtedness to the government for capital expenditures, and for the adjustment of indebtedness on the part of the government to the carriers arising out of Federal operation, neither of which has yet been done. The Railroad Labor Board, while empowered to adjust disputes between railroads and their employees, was given no authority to enforce its decision or to fix wages independently of such disputes. Neither the railroads nor the employees have obeyed the orders of the Labor Board, and the recent abortive strike movement was in defiance of one of its rulings.

This is, in brief, the history of events which have led up to the present situation. It is the story of our first large experiment in what was equivalent to government owner-

SECRETARY H. C. MESERVE.

ship of the railroads, and serves to emphasize President Harding's observation that what we need is less government in business and more business in government.

As a member of the Committee on Manufactures at the recent Unemployment Conference in Washington I advocated the repeal of the Adamson Law and the transfer to the Interstate Commerce Commission of the functions of the Railroad Labor Board. My reason for doing this was a conviction that until our railroads are allowed to conduct their business without legislative interference between them and their employees, they cannot reduce their costs and reasonable freight rates will be impossible. With present freight rates, prices will remain higher than the public is willing or able to pay, and industrial depression and unemployment will continue. The railroad managers realize that freight rates are too high, but cannot afford to have them lowered until costs of operation are reduced.

The average wage paid to all railroad employees in 1915, according to figures prepared by the Bureau of Labor Statistics of the Department of Labor, was $830. The average paid to all employees in 1920, according to the same authority, was $1,908. These figures indicate that

the average wage earned by railroad labor in all classes has been increased 130 per cent since 1915.

It is claimed by labor leaders that wage increases on the railroads were not made as soon as those in other lines, but the fact is that, in most cases, the advances were made retroactive, so that this contention is not justified. The average earnings of railroad employees for the period 1915-1920 inclusive, indicate that the advances were made relatively early, beginning in 1915 and increasing each year thereafter until 1920. In some cases, particularly those of lower paid labor, the increase was more than 400 per cent. Section hands, for instance, who were paid an average of $454 in 1915, earned an average of $1,182 in 1920.

In order that you may appreciate the burden present freight rates impose on industry and the extent to which they add to the cost of living, I am giving you the dates and amounts of the advances made in the Eastern territory since the beginning of 1915. These are as follows:

February, 1915	5 per cent
September, 1917	15 per cent
April, 1918	15 per cent
June, 1918	25 per cent
August, 1920	40 per cent

With these cumulative advances, freight rates have been increased 112 per cent since 1915 in the territory east of the Mississippi and north of the Ohio. Since freight rates are multiplied many times in the cost of producing and distributing all manufactured articles, it will be seen that these advances had a tremendous influence on the cost of production and greatly increased the cost of living.

Perhaps the most marked influence exerted by excessive freight rates in helping to bring about and continue the present business depression is their effect on the prices of farm products. The farmer is now compelled to sell his products at prices only 13 per cent above pre-war figures and is obliged to pay nearly double the freight to his market which he paid prior to 1915. At the same time he must pay for all of the things he purchases on a much higher basis than prevailed in 1915. Nothing except a general reduction in freight rates will cure this condition. The six and a half million farmers form the largest group of purchasers in this country, under normal conditions, buying 40 per cent of the total output of mills and factories. They are unable to purchase under present conditions because they have no profit left after freight charges to the points where they market their products are deducted. Until the purchasing power of this important group is restored, we cannot have normal operation of mills and factories, steady employment or prosperous business.

Transportation charges enter into and are felt in every activity of life. They affect production costs at farm and factory and, in addition, increase the cost of distribution to the consumer. This was shown conclusively when the last advance of 40 per cent in freight rates became effective in this territory in August, 1920. Decline in demand was observed as early as September, 1920. Insistence on the part of consumers that prices be lowered was felt in every direction. Full production in all lines could no longer be sold, prices declined and wage reductions naturally followed, the final result being the conditions existing during the present year.

This deplorable situation is not a question of politics, but one of economics. I believe that the first real step in the right direction is restoration of normal conditions on the railroads by repeal of the Adamson Law and modification of the Esch-Cummins Act to permit abolition of the Railroad Labor Board, or the transfer of its function to the Interstate Commerce Commission. The Adamson Law was an emergency measure and passed under stress of circumstances. Government agencies such as the Railroad Labor Board do not respond quickly to changing conditions or to public needs.

Until this legislation is enacted and the railroads are allowed to deal with their problems of operation without undue interference and free from the triple control now exercised over them by their management and two separate Government agencies, normal freight rates will be impossible, because excessive costs of operation will require excessive rates. On the other hand, if the railroads are again given an opportunity to manage their business in an efficient and economical way, as all business must be managed in times like these, railroad labor will be at once reclassified on proper lines and paid the rates prevailing in localities through which the railroads pass; transportation charges will be reduced; the cost of living will decline; the farmers' buying power will be restored; factories will operate and transportation facilities will be again fully utilized.

The November number of "Dyestuffs," the organ of the National Aniline and Chemical Company, was a specially prepared textile number, issued in connection with the International Textile Exposition in Boston. This number is unique and is unusually interesting. The leading feature is a most interesting review of "The History of Textiles in the New World," by M. D. C. Crawford, the well known writer on textile research subjects, who, as research editor of the Fairchild Publishing Company and research associate of decorative arts of the Brooklyn Museum, has made an extensive study of the development of the industry on this continent. The article is illustrated with reproductions of primitive fabrics, and the cover design for the booklet is a composite of a number of various ancient textile designs.

A large number of photographs, showing installations of power equipment in southern cotton mills, are contained in a new booklet issued by the Allis-Chalmers Manufacturing Co., Milwaukee, Wis., as Bulletin No. 139. This bulletin shows equipment as installed in the mills, including special installations for individual and group drive for looms, spinning frames, twisters, pickers, etc. The preface of the booklet tells the story of Allis-Chalmers equipment in a brief manner—leaving the numerous photographs to tell the most in their own manner.

The Cyclone Fence Company, with general offices at Waukegan, Illinois, have established a branch office at 920 Healey Building, Atlanta, Ga., through which all business in the southern section will be conducted. This office is in charge of W. K. Sandmeyer, who has two salesmen working with him in this territory. The company announces that with these new facilities, they are now in better position to render complete and prompt service to the trade.

Popular Textile Chemistry

BY JAMES A. BRANEGAN,
PRESIDENT, KALI MANUFACTURING CO., PHILADELPHIA.

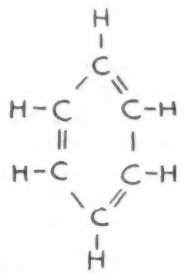
Aniline Oil ($C_6 H_5 NH_2$) Aminobenzene

The familiar product known commercially as Aniline Oil belongs in that great branch of science called "organic chemistry." In a broad sense the word "organic" means the chemistry of carbon and its compounds and would embrace the chemistry of all animal and vegetable tissue as well as inert carbon matter. To the chemist, however, organic chemistry usually means the study and development of coal tar products and aniline oil is a development of these products. Aniline oil was discovered in 1826 by Unverdorben among the products of the distillation of indigo. Later Fritsche obtained it from indigo by distilling with strong potash and called it aniline from the Portugese word "Anil," which in that language means indigo. Its production synthetically by reduction is due to Dr. Zinin.

If we put a piece of coal in a retort (which is actually an iron or fire clay still) and heat the still from below a liquid will be distilled from the coal just as steam is vaporized from a tea kettle. If we condense the vapor from the tea kettle we get distilled water and if we collect the liquid coming from the coal we get coal-tar liquor. What remains in the retort is known as coke and the process which is really a dry distillation is known as "the destructive distillation of coal." Coal-gas is produced at the same time, so that we have two sources of coal tar, from plants producing illuminating gas and from those operations where coke is the more desired product. The quantity of tar varies with the character of the coal, the usual yield being 10 to 20 gallons to the ton.

This coal tar is not a simple unit, but is a mixture of various compounds such as Benzol (benzene), Toluene, Xylene, Phenol (Carbolic Acid) Napthalene, Cresol, Anthracene, Pitch and Water. These are known as crudes and as each has a different boiling point they are easily separated by a process called "fractional distillation." By this process the temperature of the liquid (coal tar) in the still is gradually raised until it reaches the boiling point of the benzol group (benzene, toluene, xylene); this temperature is about 170 degrees centigrade and the group is collected in a receiver. The temperature of the still is then raised to 230 degrees centigrade and the next group (carbolic acid group) comes off and this raising of the temperature is continued until only a residue of pitch remains in the still. The first group is with more care again fractionally distilled until the benzol (benzene) which boils at 80 degrees C is obtained pure and it is from this benzol that aniline oil is manufactured. In this article we are using the popular name "benzol" instead of the technical name "benzene."

The chemical formula for benzol is C_6H_6 meaning six atoms of carbon and six atoms of hydrogen. The two elements, carbon and hydrogen, are not strung out in a line but are in the form of a ring or hexagon (Kekule's theory). Each point of the hexagon is a carbon atom and attached to each carbon atom is one atom of hydrogen as follows:

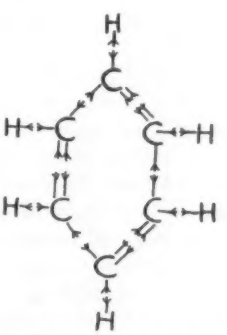


This is known as the structural formula of benzol. It will be noticed that every other bond forming the ring is a double link and this needs some explanation. Let us imagine that the carbon and hydrogen atoms are small insects and alive, and further let us imagine this carbon insect has four arms with hands thus:

and that the hydrogen insect has only one arm and hand as follows:

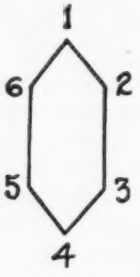
Now it is known and has been proven all elements have a certain number of bonds or arms which when the element is used to form a compound must be satisfied or, in other words, grasp the hand of another bond and no substance can exist with unsatisfied bonds. An atom cannot grasp its own hands but it can grasp the hand of another atom of the same element or it can grasp the bond of an atom of a different element. We call the property "valence" or the combining power of an element and carbon always has a valence of four while hydrogen is the unit or one.

Taking all the foregoing into consideration let us reconstruct benzol with the hands just about to grasp each other. Note the four hands of carbon and the one hand of hydrogen.



Observe how every bond is ready to join another bond and the formation of the double link. As this benzol ring is the nucleus of practically all coal-tar chemistry for the sake of brevity we write it as follows:

It will be noted the hexagon is elongated in the sketch and this is done partly to economize space when a number of them are drawn side by side and also to assist the mind in remembering which carbon atom is being used in a chemical reaction as some carbon atoms in the ring act differently when combined with other chemicals. To assist the memory these carbon atoms are numbered.



By elongating the hexagon we can omit the figures and easily retain the position of the relative carbon atoms.

This ring structure of benzol is known as Kekule's theory and many reactions with other chemicals and elements have proved it to be correct and it is perfect enough to enable us to work out chemical reactions and new compounds on paper and later prove their correctness in the laboratory.

In determining the weight of the elements and compounds we consider hydrogen as the unit or one, and as a carbon atom is twelve times heavier than a hydrogen atom we give carbon an atomic weight of 12. Benzol is C_6H_6 and therefore its atomic weight is

	Atoms		Atomic Weight	
Carbon	6	×	12	= 72
Hydrogen	6	×	1	= 6
Molecular weight of Benzol				= 78

Analysis has proven this to be correct.

The first step in the manufacture of aniline is nitro-benzol which as the name signifies is a compound of nitric acid and benzol. But nitric acid and benzol alone will not produce nitro-benzol. Some other agent must be present to take up the water from the reaction and for this purpose strong sulphuric acid is mixed with the nitric acid. The formula for nitric acid is HNO_3 meaning one atom of hydrogen, one atom of nitrogen and three atoms of oxygen. The small figure after oxygen (O_3) signifies three atoms and when no figure follows a symbol it signifies one unit or atom as in chemistry the figure one is usually omitted; while a large figure before the formula of a complete compound signifies a number of complete molecules thus: 8 HNO_3 means eight molecules of nitric acid, each and every molecule containing one hydrogen atom, one nitrogen atom and three oxygen atoms. The formula for sulphuric acid is H_2SO_4 (2 hydrogen atoms, 1 sulphur and 4 oxygen) and water is H_2O (2 hydrogen and 1 oxygen). When this mixture of nitric and sulphuric is run into well cooled benzol the following reaction takes place:

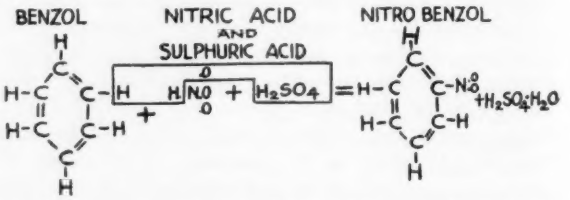
1st reaction { Benzol + Nitric A. = Nitrobenzine + Water
C_6H_6 + HNO_3 = $C_6H_5NO_2$ + H_2O

but the water would not separate without a dehydrating agent such as sulphuric acid, we, therefore, have the second raction.

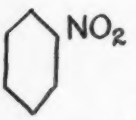
SECOND REACTION { NITROBENZOL + WATER + SULPHURIC
$C_6H_5NO_2$ + H_2O + H_2SO_4

In practice both reactions occur at the same time. After this reaction is complete the mixture will separate into two distinct layers, the lower layer being the Sulphuric Acid and water, while the upper layer is the Nitrobenzol. The acid and water are drawn off at the bottom and the Nitrobenzol purified by distillation with steam.

Using Kekule's theory and the ring formation the complete reaction is made clear.



Note the formation of H_2O and its absorbtion by the sulphuric acid and how the NO_2 becomes attached to the carbon element in the benzol. In order to show the ring compound and for the sake of brevity we write nitro-benzol as follows:



Nitro-benzol is known commercially as Oil of Mirbane or Artificial Oil of Bitter Almonds.

The next step is called reduction, in other words, the nitro acid group attached to the benzol is reduced to ammonia by iron and hydrochloric acid (muriatic acid). This hydrochloric acid, however, does not appear to enter into the reaction beyond the initial stage. It simply appears to act as a stimulant by generating the first nascent (active) hydrogen which starts the reaction. This reaction is expressed as follows: (Note the symbol for iron is "Fe" from its technical name Ferrum:

NITRO BENZOL IRON WATER ANILINE IRON HYDROXIDE

It will be seen from the foregoing that all the atoms of elements are used and the equation balances. Part of the iron oxide is converted into Chloride of Iron by the Hydrochloric Acid, otherwise the equation is exactly as shown.

In a previous paragraph we explained how the molecular weight of nitro-benzol is 78, now in making aniline while we lost one hydrogen (atomic weight 1) we added NH_2, one atom of nitrogen (atomic weight 14) and 2 atoms of hydrogen (atomic weight 1 each). Therefore, the molecular weight of aniline becomes

$$78 - 1 = 77 + 16 = 93$$

and this is proven in practice as 78 lbs. of benzol will produce 93 parts of aniline after making allowance for slight losses from leakage and impurities.

Technically aniline is aminobenzene. In chemistry when one atom of hydrogen in ammonia, formula NH_3 (1 part nitrogen, 3 parts hydrogen) is replaced by an organic group we call the product an amino compound and as aniline is really ammonia with one of its hydrogens replaced by benzol it becomes aminobenzene. No method as yet, however, has been discovered for making aniline by direct combination of ammonia and benzol.

Aniline as it comes on the market is a colorless liquid which gradually darkens on exposure to air and light. The darkening of the oil is due to oxidation and this tendency of aniline to oxidize is used in producing the dye known as aniline black and which we will refer to further on.

Aniline boils at 182 degrees to 183 degrees C. and solidifies at 8 degrees C. Its specific gravity is 1.024 at 16 degrees C. and being only slightly soluble it sinks when poured into water. The product known as "Aniline Salt" is simply a mixture of Aniline and Muriatic (Hydrochloric) Acid, and in chemistry we call this product Aniline Hydrochloride. To be theoretically correct the name for aniline salt would be

AMINO-BENZENE-HYDROCHLORIDE
(Ammonia) (Benzol) (Muriatic Acid)

The presence of Aniline is detected by pouring a drop of the suspected liquid into a solution of bleaching powder. If Aniline is present an intense violet is produced, which quickly turns brown and fades.

In the manufacture of dyestuffs there are three distinct steps or products namely; crudes, intermediates, and finished dyestuffs. Aniline is not a dye itself but belongs to the middle group and of all the "intermediates" it is the one most frequently used and most productive of finished colors. In dyeing aniline black the oil is used as an intermediate and the dyestuff is manufactured on the fiber with the aid of various chemicals and oxidizing agents, for instance in dyeing hosiery 90 lbs. of aniline oil are cut with 100 lbs. of muriatic acid (low in sulphuric and free from nitric acid), this produces aniline salt. This salt solution is mixed with chlorate of soda, bluestone, sal ammoniac, aluminum acetate, and water, the final product showing 12 degrees Twaddle. The goods and this mixture are worked together thirty minutes (Tom-tom). Then run into the hot room (115 to 120 degrees F.) until dark green, and finally taken out of the oxidizing machine and aged two or three hours. Afterwards they are chromed in bichromate of soda and finished with a good oil softener.

From this process it can be seen that the final product or dye is much different than the intermediate aniline oil. In fact so complex is this reaction that it is one of the few dyes the chemical or structural formula of which has never been figured out.

The addition of acetate of alumina is very important as it strengthens the fiber which would otherwise be tendered from the rough process and chemicals used, furthermore it intensifies the black and adds to its brightness.

When mixing the aniline oil and muriatic acid in the foregoing process or any other process where aniline salt is required, the following precautions should be observed: Weigh out 90 lbs. of aniline oil and 100 lbs. of muriatic acid. It is important that the aniline be as light in color as possible (unoxidized) and free from toluidine and that the muriatic acid should be almost free from sulphuric acid and absolutely free from nitric acid.

Place the 90 lbs. of aniline oil in a mixing tank (a wooden cypress tank preferred) and add 100 lbs. of muriatic acid slowly by running from a syphon made of glass tubing dipped below the surface of the oil. The mixture should be stirred continuously while being mixed and if done slowly there will be no fumes or loss of strength. Add sufficient water to make 50 gals. and after cooling the mixture it is ready for use. The fumes of aniline oil are poisonous and also the oil can be absorbed through the skin with dangerous results.

Aniline oil has other uses besides the manufacture of color and dyeing blacks. It is used in medicine to a slight extent and largely in the manufacture of certain coal tar pharmaceuticals. The well known headache cure Acetanilide is, as its name implies, a mixture of acetic acid and aniline oil. In the vulcanization of rubber it has been found that when accelerated a better product is produced and some manufacturers for this purpose use aniline oil or a mixture of aniline and formaldehyde.

Prior to the war there was only one American plant manufacturing aniline oil, most of it being imported from Germany. Now, however, this country is well equipped with aniline plants and should have no difficulty retaining the position it has developed.

It was from aniline oil that the young chemist Perkin produced the first aniline dye, and of all the coal tar products aniline oil is the greatest.

[The next article of the series will deal with chemical wood products as used in the dyehouse. It will includ Formaldehyde, Acetic Acid, and Wood Alcohol.]

The second edition of "Textile Design and Colour," by William Watson, has been published. In this edition of this work, which deals chiefly with the designing and coloring of those fabrics that are composed of one series of warp threads and one series of weft or filling threads, corrections have been made in the original text, published a number of years ago, and an appendix added.

The construction and combination of simple and special weaves; the structure of standard classes of cloths; the application of colors to textile fabrics; the designing of ordinary figured fabrics; the theories of color; textile calculations; and the principles and limitations of weaving machinery—these subjects are treated fully in various sections of the book.

A new feature of this second edition is the addition of an appendix on "Standard Yarns, Weaves and Fabrics." In taking up this subject, which has recently received much attention, the idea has been to deal chiefly with examples possessing some special feature in either structure or method of manufacture.

The book, including the appendix, contains 425 pages, and 413 figures which include over 1,800 different diagrams, designs and representations of woven fabrics. Longmans, Green & Co., Fourth Avenue and 30th Street, New York City, are the publishers. Copies may be secured through COTTON'S Book Department, if desired, or direct from the publishers.

It takes a powerful memory to keep up with what you say if you talk much.

All things come to him who hustles while he waits.

Simplicity in Textile Cost Methods

BY RALPH E. LOPER.

In designing a cost system for a textile plant one should take full advantage of the fact that the processes of manufacture are continuous, that the order of the operations does not change and that there is a uniformity in the material used and in the production efficiency week after week. Any one coming into the textile industry from almost any other is certain to be impressed by the high degree of operating efficiency obtaining in the majority of textile plants. I have seen increases in output amounting to 30 or 40 per cent in other industries attract less attention than a 5 per cent increase in a well-managed textile plant. Often a difference of 10 per cent in the production from a textile mill would mean the difference between profit and loss. The continuous nature of the textile processes and the fairly uniform results week after week make it possible to greatly simplify textile cost methods and at the same time to increase their accuracy.

What Should Costs Include?

Confusion is very apt to occur when mill men from different localities try to compare their costs on similar fabrics, because neither is quite sure just what the other has included. It may be well to consider for a moment some of the items upon which differences of opinion frequently exist.

Depreciation is an important item of cost. It is with us during periods of depression as well as periods of prosperity and should always be included. It is encouraging to note that the practice of ignoring it during dull periods and making liberal allowance during profitable years is rapidly disappearing. The attention called to depreciation in connection with tax returns is largely responsible for this improved practice.

Excess-Profits Tax is not a part of cost because if goods were sold at cost there would be no tax to pay. This should, therefore, be handled as a deduction from profits.

Brokerage and Commission. These items are not a part of manufacturing cost but of selling expense. They can be handled most accurately as a deduction from the selling price when considering a sale.

Interest on Invested Capital. It is very important that this item should be included in cost calculations. Interest is, however, very frequently omitted. Yet, when this is done, entirely erroneous impressions may be obtained regarding the differences in cost to produce on old or new equipment, upon plain and automatic looms, etc. To omit interest on invested capital from cost calculations is apt to have a bad effect upon the selling policy especially when a plant is undercapitalized, as are many in the textile industry. Frequently one finds a mill manager who considers profits satisfactory when a dividend of 2 per cent per quarter is earned on the capital stock. Yet, in many cases, an analysis will show that this is equivalent to about four per cent upon the money actually invested in the business. A mill does not begin to make a manufacturing profit until it has earned bank rate of interest on all the capital used in the business.

The ruling of the Internal Revenue Authorities that interest must be omitted from figures submitted to them as cost, should not be allowed to affect the cost figures for selling purposes. The ruling merely interprets the law which intended to tax this income. The United States War Department has for many years included interest in their cost calculations at the arsenals, and manufacturers may well follow this same practice in their own cost work.

The Other Items to be included in cost are those usually found in the trading accounts and upon which there is very little room for differences of opinion.

Having discussed the items which will be included in costs, it may be well to consider how best to determine the amounts which will be charged to cost for each item.

The general accounts are the most dependable source of information regarding previous periods. The sales management is, however, much less interested in what actual costs were for the period that is closed than in the probable costs for the period during which sales are contemplated. The fact that a cost system ties in with the general books for the previous period is no indication that it is a safe guide for the future sales policy.

With the records of the general books before one, it is well to separately consider each item which is to go into the cost records. If the price of fuel has just been cut 20 per cent then the amount allowed for it should be reduced accordingly. If an increase in the state or local tax rates has been announced, a proportional increase should be made in the allowance for these taxes, and so on, through the list of items.

If the combined costs of all products will prove with the amounts determined as above and with the actual production, it is safe to believe that the profit indicated on each sale will be realized at the close of the period. By this method the costs may be said to reconcile with the general accounts, although they do not tie in with the general books for any historical period.

Production Records and the Cost System.

Reliable production records from the manufacturing departments are very essential for maintaining the accuracy of a cost system. The detailed results from a cost system will not be more accurate than the basic information entering into the calculations.

To meet the requirements of the superintendent, production data must be available at frequent intervals and must reflect in detail the results of each operation. The operating department is more interested in the facts which affect cost than in the cost figures themselves. The agent who sells the cloth needs to know the final cost per yard so as to compare it with the market price in choosing profitable styles. It is not enough to tell the superintendent that the manufacturing cost of a style has increased one-eighth of a cent a yard. This increase may be due to low production in any department from the picker room to the cloth room, or it may be due to goods being above weight, to high cost of supplies, to an extra amount of help or to higher wage rates. The superintendent must know exactly what has caused the increase in the cost per yard before

Extracts from an address before the National Association of Cotton Manufacturers.

he can take any corrective measures. Suitable comparative reports showing in detail for each department the changes which ultimately affect costs are far more useful to a superintendent than the final cost figures.

Since the requirements of the production department and the sales force are so fundamentally different, it is well not to try to make one set of records serve the two purposes at the same time. In fact, it is possible if the separation is logically carried out to meet the requirements of both branches of the business much more fully and at the same time reduce the clerical work required to maintain the cost system.

In doing this the cost system should be made to serve primarily the sales force. The superintendent can then be provided with up-to-date comparative reports covering the consumption of supplies, the weight of his goods, the production at each process, the department pay-rolls, etc. If proper standards have been set as a guide, records of this sort will make it possible to discover the causes of high cost promptly, and while there is yet time to correct them.

These records would be filed and later analyzed to furnish a basis for the development of reliable comparative cost by products.

The reason why it is advisable to study carefully the production records before using the data for cost purposes is that it is impossible to accurately determine weekly production in many departments. If you take these same reports at the end of a month or a quarter, it is possible to discover and eliminate many of the discrepancies, For example, every one knows the difficulty in obtaining accurate records of the production of filling from the ring spinning department. It is a very easy thing for an optimistic ring spinner to report a production greater than the weight of roving received from the card room. One cannot detect this error in the production of a single week. If the information is carried forward for cost purposes weekly, then the error will be included. If, however, the production data is allowed to accumulate for a while and is then analyzed and the reports of the various departments compared, it is an easy matter to detect and to eliminate many of these errors. In this way the data entering into the cost system can be made more reliable than the weekly production reports upon which it is based.

Distribution of Overhead.

The majority of textile mills have made some study of their cost problems. Very often the superintendent has made a very reasonable distribution of the pay-roll. In many cases the advantage thus gained has been lost, however when the distribution of supplies, salaries, depreciation, taxes, insurance, etc., has been attempted.

Some treasurers contend that it is not necessary to divide the overhead between the weave room and the various yarn departments to get accurate costs by fabrics.

They frequently argue that since they sell only cloth, all these charges must be borne by the cloth eventually so that it does not matter how they are distributed, so long as the correct total is included.

By comparing the results from a number of mills where the burden has been correctly distributed, we find that it has a very important bearing upon the relative costs of styles. In mills having simple looms and making plain cloth the overhead charges are about as important as the weaving piece work. Among mills using automatic looms, the overhead charges on cloth are very often more than twice as much as the weavers' pay. Confusion and errors are apt to occur if the cost system fails to make each product bear its fair portion of the overhead.

The following inaccurate methods of distributing overhead are in fairly common use.

1. Overhead is charged uniformly per lb. of cloth.
2. Overhead is charged uniformly per spindle.
3. Overhead is charged uniformly per loom.
4. Overhead is charged as a percentage on direct labor.
5. The mill is sometimes assumed to be running one style.

Very little can be said in favor of these methods. Some of them under figure the cost of high pick goods and goods woven on narrow looms, others under estimate the cost of wide cloth and low pick goods. Any of them is liable to prove misleading when most needed.

That the proper distribution of overhead is not unduly complicated nor difficult to understand may be shown by considering several typical items.

Property Taxes are distributed upon the value of land, buildings and machinery used by each department;

Fire Insurance on buildings and machinery is distributed upon the value of buildings and machinery;

Liability Insurance upon the pay-rolls of departments, and

Power Cost upon the horsepower required by each department.

Similarly, for nearly every item of overhead there is a reasonable basis for its distribution, so that each department shall bear its proper share and reliable machine charges may be developed wherever required.

Getting the Most Out of Costs.

The value of a cost system does not lie in the time and effort spent upon it nor even upon the amount of accurate information it contains, but rather in how much the treasurer or agent can get out of it during the brief time available when he is making a sale.

Some otherwise good systems lose a large part of their usefulness because they fail to arrange the data in convenient usable form, with the result that many decisions must be made without waiting to check with the cost system. During the years we have specialized in textile cost problems it has been our privilege to enjoy the cooperation and criticism of many well-known and successful mill men. It is largely due to their suggestions that the results have taken their present general form.

Every mill has its own peculiar problem which must receive special consideration, but the management is usually interested in the following points, among others, when choosing the goods they will sell:

1. The extent of the demand for the particular product. Some styles may show a good profit and yet it would be unsafe to run them for stock when orders are scarce because of their limited use.

2. The total cost of each product based on current prices of raw materials.

3. The production per loom and per spindle and the spindles required to run one loom. This is necessary to know the effect the style will have upon the balancing of department productions. The production also has an important bearing upon profits. Much greater profit is re-

quired per pound on fine numbers than on coarse, because the management is interested in obtaining a maximum total profit, not a high profit per pound. The cost data should show how the various profits per pound on the different styles will affect the total profit of the plant.

Costs and Profits.

Those selling the products of textile plants frequently contend that it does little good to know costs accurately because they do not set the selling prices, but, instead, are obliged to accept the market. It is quite true that gray goods mills seldom have the chance to set their own prices, but they do have a chance to choose in most markets the constructions they will make. That there is a real opportunity to increase the profits of a mill through cost data by wisely choosing the constructions to make. This can easily be demonstrated by anyone who will take the trouble to compare the market prices on his different constructions over a period of years. That such opportunity exists for mills making the commonest kinds of plain goods can be shown by comparing the prices during the past ten years of standard prints, tobacco cloths, sheetings, shirting, poplins, crepes, and other weaves which can be made on plain looms or to which they can be adapted. One finds that goods on which the market prices per pound are within one cent of each other at times will differ by several cents per pound at other times for periods of over a year. There are numerous examples of this sort and it does not require accurate cost data to prove that market prices do not reflect manufacturing cost, and that the treasurer who knows his margin of profit on each style has an important advantage in any market.

Just to illustrate the point, let us compare the market prices on two standard print constructions during the past three years. In 1918 the government fixed the price on 38½-inch—64 x 60—5.35 prints at $0.83 per pound and on 39-inch—80 x 80—4.00 yard at $0.86 per pound. This margin of three cents per pound was about the same as had existed just previous to price fixing and was accepted by everyone as fully covering the difference in cost, because the styles are made from the same yarns.

Soon after price restrictions were removed the margin rose to over six cents. By June, 1919, it had risen to sixteen cents per pound, and it averaged this amount during the last six months of 1919. This large difference came to attract more mills, and early in 1920, although the prices continued to rise, the margin began to narrow. Soon it was below five cents, and at times during the decline 80 x 80 sold for less per pound than 64 x 60s. This condition did not continue for long. The premium on 80 x 80 over 64 x 60 soon returned, and today it stands at about six and a half cents per pound.

Although such margin fluctuations may at first glance seem excessive they are not at all unusual. Even greater fluctuations occurred during this same period among fancies, specialties, and fine goods.

Proving the Cost System.

No system is worthy of full confidence unless its accuracy can be proven. It is especially important when we attempt to predetermine the costs for any period to be able to check our results from time to time as the period progresses.

This can be done readily by choosing three or more consecutive full weeks and by making the following computations:

First list all of the finished products during this test period. Opposite each, enter the manufacturing cost per pound, as previously estimated, and the number of pounds produced on each product. Multiply the manufacturing cost by the production on each style and thus determine the detailed cost of all products, based on previous estimates. This total should check very closely with the amount of the weekly pay-rolls plus the overhead chargeable to this number of weeks. If the results agree, the cost figures may be used with full confidence, and in any case the percentages by which previous estimates differ from the actual cost can easily be determined.

Briefly stated, the points which any good cost system should cover include the following:

1. The system should be simple to operate and convenient to use. The agent or treasurer should be able to quote on any of his styles in any cotton market without delay.

2. The system must preserve the true relative cost of the styles. That is, it must be free from the effects of accidents in production and any unusual temporary manufacturing conditions.

3. The overhead must be distributed in such a way that each department will bear its equitable share.

4. The cost system should be prophetic rather than historical. Its accuracy should apply to the period for which sales are contemplated and not to any period of the past.

5. Its accuracy must be susceptible to proof, which usually implies reconciliation with the general accounts.

6. It should provide a convenient means to pre-determine the effects of a wage change upon fabric costs.

In closing let me again say that a cost system is not a system of management. It is not a substitute for good trading ability or foresight, but if it is properly designed and the cost figures are reduced to compact convenient form, the system will pay its way many times over and will leave the management much more time in which to study markets, search out profitable lines, and handle the many other important problems which claim attention.

The Discussion.

The discussion following this paper was led by F. L. Branson, general manager of B. B. & R. Knight, Inc., Providence, R. I., who said the most interesting feature about the paper, and one he had seen worked out in the last two years, was that there is nothing very mysterious about cost accounting, and it was most interesting to learn from Mr. Loper's discussion that a cost system may be laid out on sound lines and so maintained without a great deal of expense.

Mr. Branson then pointed out that there were a number of points for discussion in Mr. Loper's paper, among which he mentioned the inclusion of interest charges, the method of overhead distribution, the method of handling the material or stock charge, and the question of tying in the cost figures with the general books. He indicated that the contention of Mr. Loper that it is advisable to have one set of records for operating purposes and another set for sales purposes might be subject to criticism. That is was a new viewpoint, he admitted.

Responding to Kenneth Moller of Lockwood, Greene

(*Continued on page* 91.)

The Design and Manufacture of Fustians

BY T. WOODHOUSE AND A. BRAND.

Velveteens may also be ornamentally figured in more or less complex designs with the aid of the dobby or the Jacquard. In either case, the general principles involved are to employ one of the regular velveteen weaves for the development of the figure of the required pattern, and to cause the pile filling to interweave with the warp in the ground portion of the fabric in one of at least two common ways.

(1) The pile filling may interlace with the warp in the ground part of the pattern in a manner exactly opposite to that in which these yarns interweave in the figure portion; and

(2) The pile filling may be caused to float loosely on the *back* of the ground portion, from which position it is removed by a process of brushing subsequent to the cutting operation.

The various point paper designs, plans, etc., in Fig. 17, which will be discussed immediately, are introduced to give a definite example of a simple type of figured dobby cloth, in which the figuring pile is developed in the usual way, and in which the ground portion is developed by the above-mentioned first method. It might be stated at once that the plan K, Fig. 17, is the weaving plan, from which it will be seen that the number of harnesses, viz., 10, necessary for the design shown is comparatively small, and is well within the scope of an ordinary Woodcraft positive tappet or other similar shedding motion. But the large number of picks necessary—in this case 96—precludes the possibility of using tappets of any kind, and compels the adoption of a dobby. The character of the design demonstrated is extremely simple; indeed, it is mainly chosen and arranged for an easy elucidation of the principles involved. The methods indicated in the following few paragraphs hold good, however, for much more complex designs than that used for demonstration purposes.

The usual method of representing the plain weave at A, Fig. 17, may be considered as a diagrammatic representation of one unit of a very simple dice or chess-board design. In the present case, the black squares shall indicate the pile surface which forms the figure, while the white

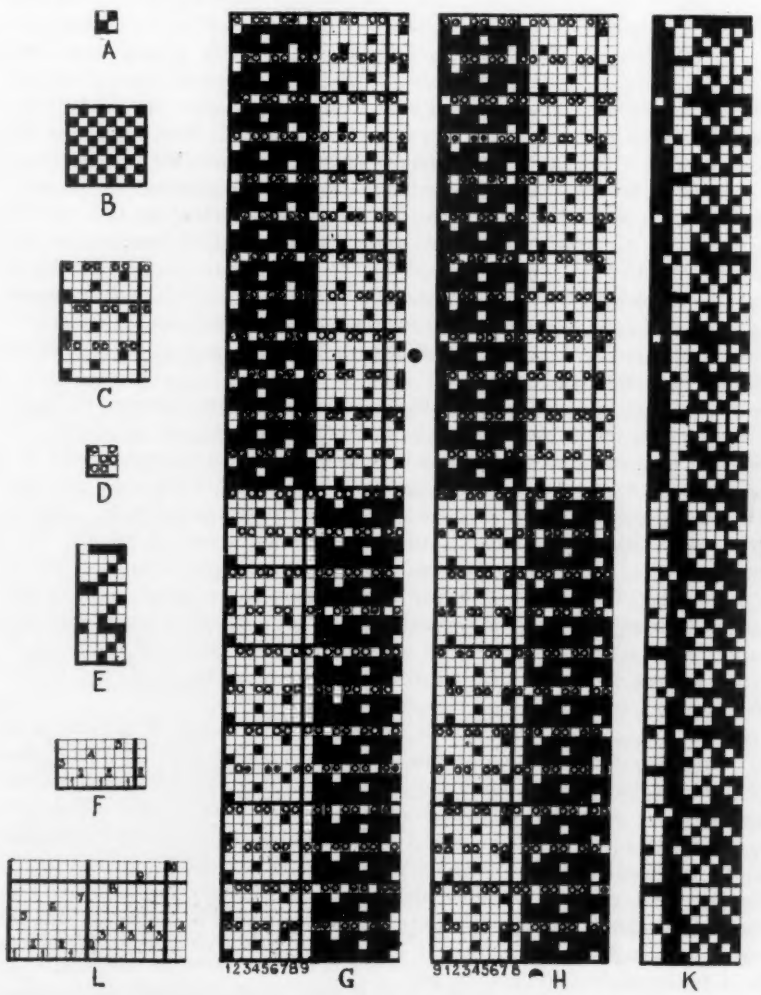


FIG 17.

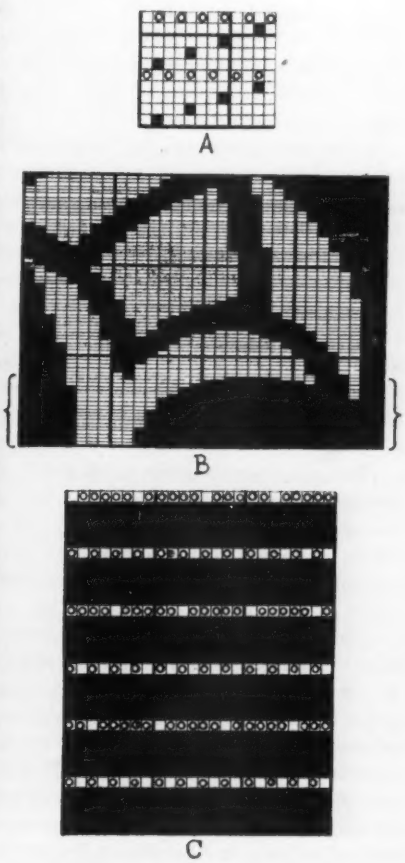


FIG. 18.

squares shall be taken to represent the ground. Four repeats of this unit, both in the way of the warp and of the filling, are shown at B in the same figure; as a concrete example the plan B may be regarded as representing one square inch of the finished cloth, so that each small block of the dice measures one-eighth of an inch square.

Before a suitable design can be planned to produce the desired effect, it is necessary to fix the setts of the warp and filling, and to determine an appropriate weave for the development of the figure portion. Let it be assumed that there are 72 warp threads per inch, and 384 picks of filling per inch in the cloth; then, since there are 8 blocks of the dice each way in one square inch, we have—

$$\frac{\text{72 threads per inch}}{\text{8 blocks per inch}} = 9 \text{ warp threads in one block of the dice, and—}$$

$$\frac{\text{384 picks per inch}}{\text{8 blocks per inch}} = 48 \text{ picks in one block of the dice.}$$

Each block of the dice is thus composed of 9 threads and 48 picks; therefore, the complete design to reproduce the effect as exemplified at A, Fig. 17, will be complete on

$$2 \times 9 = 18 \text{ threads, and}$$
$$2 \times 48 = 96 \text{ picks.}$$

In regard to the choice of suitable weaves, it is desirable, although not absolutely essential, that the number of warp threads in one unit of the ground weave should be a factor of the number of warp threads in one block of the dice, and that the number of picks in one unit of the ground weave should, similarly, be a factor of the number of picks in one block of the dice. Again, without being essential, it is desirable that the numbers of threads and picks in the base weave should be factors of the numbers of threads and picks in the complete design.

A suitable base weave for the present example, and one which satisfies the numerical conditions mentioned above, is given at C, Fig. 17, which represents one unit of a 9-thread 12-pick twill back velveteen weave, in which the picks are inserted in the regular sequence: 3 picks of pile to 1 pick of ground. The ground weave is the 2 up 1 down or prunelle twill, one complete unit of which is given at D for convenient reference. As shown by the weaving plan and corresponding draft which appear at E and F respectively, the base weave can be woven on 5 harnesses, with a suitably arranged tappet driven at a speed of one revolution for 12 picks.

The point paper design at G shows one method of developing the unit dice given at A. The correct numbers of threads and picks are marked off on the point paper, after which it is well to indicate in any suitable manner the ground picks; the remainder are naturally the pile filling picks.

The next step is to fill in the ground weave over the complete design, viz., on 18 threads and 96 picks, as shown in circles. Then mark in the stitching points in the pile picks of the lower left-hand block only, as indicated by solid squares; the order is an exact copy of that exhibited in the base weave at C. The pile picks in the right-hand bottom rectangle are then formed by reversing the pile picks of the adjoining rectangle. This reversing is done in the manner common to all ordinary dice designs, i. e., the marks and blanks in the right-hand lower block are made exact mirror images of the blanks and marks of the left-hand block so far as the pile picks are concerned. The 10th thread of the design is exactly opposite in markings to the 9th thread; the 11th thread is exactly opposite to the 8th, and so on to the last thread, the 18th, which is exactly opposite to the 1st; in every case they are opposites with respect to the pile picks only; the ground weave twills continuously in one direction throughout both (indeed through all four) rectangles, and does not change from the warp-flush form to the weft-flush form. The upper two rectangles of the dice are formed by reversing the pile picks in precisely the same manner as that already described in connection with the warp threads.

The complete design thus produced is rather defective in one or two respects. Irrespective of whether a dobby or a Jacquard is necessary, in all figured velveteens where this principle of oppositely interweaving the pile filling in ground and figure portions is employed, the outline or margin of the figure in the direction of the warp is necessarily formed by a half tuft, i. e., a J- or a reversed-J tuft. In ordinary velveteens made from the weave C, the fustian knife would sever each float of pile filling, which in this case is over 8 threads, at a point between the 4th and 5th threads in each float, i. e., between the 5th and 6th threads of the first pick in the design and at corresponding points on the other picks. In the dice design under discussion, this position is quite satisfactory in the first pick of each group of 3 pile picks. In the case of the second pick of each triple group, this cutting position would produce one full half-tuft equal to a float over 4 threads, and one short half-tuft corresponding to a float over 1 thread. This position is also fairly satisfactory, as a tuft corresponding to a float over 1 thread is very short indeed; in the present instance, since the warp contains 72 threads per inch, the float or tuft could not exceed one seventy-second of an inch. In the case of the third pick of the triple group, the short marginal tuft is equivalent to a float over 2 threads, and is proportionately more noticeable; in all likelihood it would give rise to a ragged or irregular appearance at the edge of the figure.

Design H, Fig. 17, is a simple rearrangement of the design G, but it is capable of yielding more satisfactory results. The first 9 threads in G, which are numbered 1 to 9 for reference have been rearranged in the order indicated by the corresponding figures below the design H. This rearrangement causes the stitching points of the pile filling picks to be more centrally placed in the rectangles; neither of the marginal threads interweave or stitch with the pile picks. An examination of the order in design H will show that very short marginal tufts are prevented, while, at the same time, the dice design approximates closely to a regular 2-division dice of the orthodox type.

One suitable weaving plan for design H is given at K, and the corresponding draft appears at L. The short marginal tufts above mentioned sometimes give much trouble, particularly in Jacquard figure weaving, and occasionally marks are added to stop altogether the very short marginal tufts, while marks may also be removed in order to lengthen the float and produce a correspondingly higher tuft. This will be more fully demonstrated in connection with the development of a Jacquard figured velveteen which is now to be discussed.

It will have been anticipated from the foregoing remarks

in connection with Fig. 17 that with regard to Jacquard figured velveteens, it is not every design which can be successfully reproduced in this structure. The type of pattern best suited for development by any of the usual velveteen weaves is naturally determined by the fact that the figure portion is formed by a cut pile standing up from, or raised above, a comparatively uninteresting and flat foundation formed of some simple structure. Solely because of this flatness and simplicity, the ground portion contributes little to the success of the complete design, except as a contrasting element; the pile figure is much the richer of the two portions, hence, in a good Jacquard velveteen, the figure portion will, in general, predominate over the ground portion. Further, the success of the design must depend more upon large areas than upon small detailed and insignificant parts. The weave structure renders the reproduction of small detail practically impossible, and it is thus necessary to adopt clear cut, well-defined, and comparatively large masses for the predominating ornament.

Once a satisfactory design has been produced, it is necessary to transfer it to suitable point paper, prior to its reproduction on cloth in the loom. This transference is usually effected in two distinct stages; the first stage is dependent mainly on the relative proportions of warp and filling, while the second stage—which is important in regard to the card cutting operation—is only dependent on the number of needles in one short row of the Jacquard which is to be used. The first stage involves the transference of the design to specially prepared point paper, ruled to correspond to the relative setts of warp and filling. The design thus produced is conveniently referred to as a block design, since it only differentiates between the ground and the figure of the design, and indicates no structure. The second stage is to develop this block design into a working design suitable for the operations of the card-cutter; the working design thus produced indicates to the expert the complete structural type of the fabric. Both stages will be more satisfactory demonstrated by reference to a concrete example.

Suppose that in a particular case it is desired to produce a figured velveteen containing 72 warp threads per inch and 360 picks of filling per inch. The figure portion is to be developed by a tabby-back velveteen weave, the unit of which is complete on 12 threads and 10 picks, as shown at A, Fig. 18. It will be seen that every third warp thread is used to stitch in the pile filling picks. Further, owing to the specific nature of the weave, each group of 5 picks (four of pile and one of ground) corresponds to one row of pile tufts in the finished fabric.

Since there are 72 threads of warp per inch, and every third thread is used to stitch in a pile tuft, it follows that—

$$\frac{\text{72 threads per inch}}{\text{3 threads per tuft}} = \text{24 tufts per inch in the way of the weft, i. e., across the width of the cloth.}$$

Again, since there are 360 picks per inch, and each group of 5 picks constitutes one row of tufts, it is clear that—

$$\frac{\text{360 picks per inch}}{\text{5 picks per row of tufts}} = \text{72 tufts per inch in the way of the warp, i. e., along the length of the cloth.}$$

In order to preserve the correct proportions of the original sketch design in the finished cloth, and to facilitate the operation of transferring the sketch to point paper, it is necessary in the first instance to use point paper ruled to correspond to the above numbers; thus—

$$\text{24 of warp} : \text{72 of filling} = 1 : 3$$

i. e., there are three tufts along the length of the fabric for one tuft across the width of the fabric. If the Jacquard to be used has 8 needles in each short row, the design paper must be ruled vertically in 8s, that is, 8 vertical rows of small rectangles between each pair of heavy vertical lines. If the proportions of warp and filling are, as stated, 24 and 72, the horizontal ruling, or the number of horizontal rows of small rectangles between each pair of heavy horizontal lines, must be—

$$8 \times \frac{72}{24} = 8 \times \frac{3}{1} = 24\text{s}$$

That is to say, 8×24 point paper must be used since there are 8 needles in one short row of the Jacquard, and since there are 24 rows of tufts in the length of the cloth for every 8 rows of tufts in the width of the cloth. Point paper ruled in this proportion is shown at B, Fig. 18, and on it is painted, in black, the *ground* of a small portion of a design. Woven in the setts previously indicated, this small portion of the black design represents a piece of the finished fabric 1⅓ inches wide by 1 inch long.

In regard to the second stage, note first of all that the unit weave A, Fig. 18, contains eight stitching points, that is to say, each unit weave, embracing 12 threads and 10 picks, can form eight complete pile tufts. As the pick is stitched on every third pick, there are:

$$\frac{\text{12 threads per unit}}{\text{3 threads per tuft}} = \text{4 tufts per horizontal row, and}$$

$$\frac{\text{10 picks per unit}}{\text{5 picks per tuft}} = \text{2 rows.}$$

2 rows $\times$ 4 tufts per row = 8 tufts per unit. Consequently one pile tuft may be regarded as constituted by each group of three threads and five picks in the unit weave at A. Now every little rectangle in the block design B, Fig. 18, represents one complete tuft, and so, in developing the working design, it is desirable that the steps or moves in the way of the warp be in multiples of three, and that the steps in the way of the filling be in multiples of five. A small portion of the block design B, Fig. 18, indicated by brackets, is shown in Fig. 19 developed on 96 threads and 96 picks for the card cutter.

In producing the working design illustrated in Fig. 19, every fifth pick—the ground picks—is suitably indicated, say, by a short line at the margin, and the plain weave is marked on these picks in both pattern and ground portions. The outline of the pattern is then drawn in, being carefully transferred from the block design B, Fig. 18; the steps in the horizontal direction are in multiples of three, while the steps in the vertical direction are in multiples of five, for the reasons already given. The base weave A, Fig. 18, is next marked over the whole of the figure or unpainted portion; a start may be made at any point in the figure with any suitable point in the base weave, provided, of course, that the correct relative positions of pile and ground picks are maintained. It is desirable, however, particularly where there are vertical margins, that the marginal figure warp

thread should be one that does not take part in the binding of the pile filling. Then the ground weave is marked; in this case the ground weave is such that the pile filling is caused to float loosely on the *back* of the ground portions, from which position it is afterwards removed by the brushing process mentioned.

In this method of disposing of the pile filling in the ground portions, the margin or boundary of the figure is invariably formed by complete U-shaped tufts, as any half tufts produced by running in the weaves in the ordinary way are pulled out in the brushing process. This fact renders necessary a good deal of work and care on the part of the point paper draftsman in order to secure a good well-defined figure contour. As already mentioned, the contour may be better defined and improved in at least two ways.

1. Short figuring floats of pile filling next to the ground may be extended into the ground portion in order to lengthen the floats and thus form a satisfactory race for the fustian knife. In Fig. 19, the places where this operation has been performed are indicated by diagonal lines. These diagonal lines have the same significance from the card-cutter's point of view as the blank squares; both represent filling on the surface; they are used in Fig. 19 solely for the explanatory purpose specified.

2. Very short figuring floats may be stopped altogether. The places where this is done are indicated by crosses. These crosses, like the diagonal marks, are used only for explanatory purposes; they represent warp on the surface.

It is impossible to lay down hard and fast rules as to when and where each of these processes should be used. Each design must be treated on its own merits. As a general guide, it may be stated that floats under one-quarter of

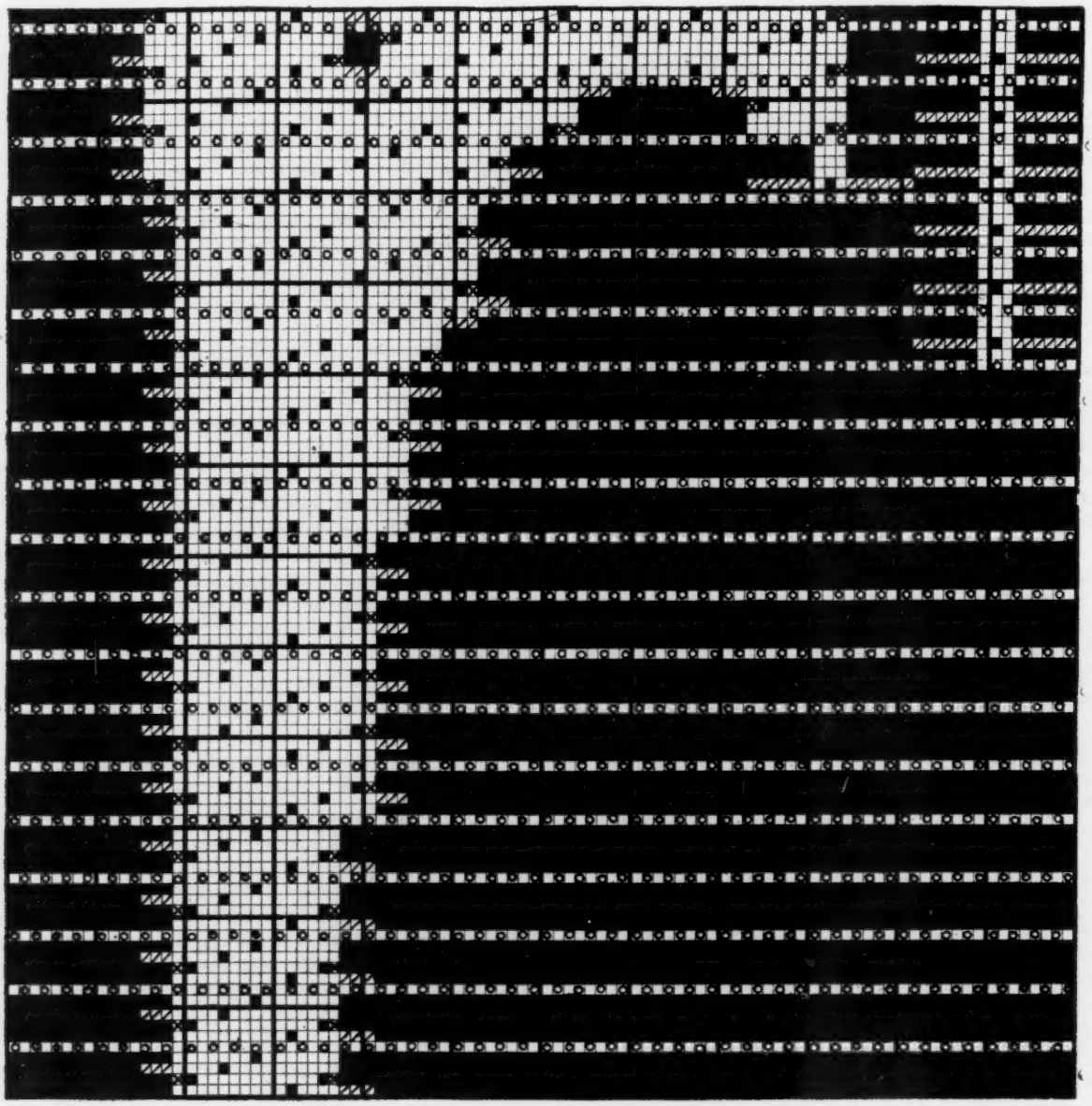


FIG. 19.

the normal length are stopped, while floats of one-quarter the normal length and longer are extended to about two-thirds of the maximum length.

In the design shown in Fig. 19, the normal float in the figure portion is over eleven threads; the nominal height of the tuft is thus equivalent to about 5½ threads. All the marginal floats of three threads and upwards have been increased to a minimum of seven, while all the floats below three have been stopped. While this is true in the main, it has not been found possible to carry it out all over the design. For instance, in the upper right hand blocks of Fig. 19, there is a thin vertical line in the figure developed by three threads and containing six stitching points. Figuring tufts can only be obtained here by extending the floats into the ground on either side of the stitching points, as indicated by the rows of diagonals. It should be noted that the original floats are over one thread only, and according to the foregoing rule they should be stopped altogether; if this were done, however, no pile tufts would be formed at this point, and part of the figure detail would be lost.

The treatment already indicated is necessary for all fine detail and serves to indicate the difficulties in the way of producing such detail in fabrics of this kind. As it is, the method does not produce entirely satisfactory results, although it is the best possible under the particular circumstances. For example, in the above-mentioned place only one complete tuft is produced in each group of five picks, and that only by according special treatment to the particular portion of the figure. Generally speaking, all such designs will prove most satisfactory when there is an absence of small detail, and when the contour lines of the figure are inclined as far as possible at an angle of 45 degrees to the line of the warp or the filling.

It may not be out of place to emphasize that the four kinds of marks used in the working design, Fig. 19, are employed for explanatory purposes only. In actual practice, only one kind of mark is necessary. The solid squares, the circles, and the crosses signify warp on the surface, i. e., marks lift. The diagonals indicate the places where the floats of figuring pile filling are extended into the ground portion for the reasons specified; in this case marks fall. While the marks—with the exception of the diagonals—thus represent warp or surface, perhaps a better idea of the structure may be obtained in the mind's eye by remembering that they may also be regarded as representing the filling on the *back* of the fabric.

Although the velveteen illustrated in Fig. 19 is actually of the plain back variety, it is not absolutely essential for this type of figured fabric that plain weave be used throughout both ground and figure. Plain weave would invariably be used in the figure portion, but a different order of interlacing the ground picks is occasionally introduced into the ground portion. One of these methods is indicated at C in Fig. 18, and this could be used as an alternative scheme to that employed in Fig. 19. It will be seen that each alternate ground pick is plain, and that the others work under five threads and over one thread. Another way of regarding the ground structure is that each alternate filling pick works plain, while the other picks form three picks of the 5 up 1 down warp flush twill.

The two methods of forming figured velveteens above described are the more common. The first method, described with reference to the dice design in Fig. 17 is probably the best of all. The second method, illustrated by Fig. 19, produces rather a loose ground structure unless in very fine setts. A third method, which finds occasional employment, is to use a series of extra fine warp threads and cause them to interweave only with the pile picks on the *back* of the ground portions. This method produces an imperfect gauzy cloth which is stitched into the main fabric at the points where the figure changes to ground, i. e., at the points where the pile filling emerges on to the back of the fabric at the figure boundary. After the fustian cutting process is complete, this light texture is separated bodily from the main fabric, and thus effects the complete removal of all the pile filling not required for the production of the pile figuring tufts.

(*To be continued.*)

Simplicity in Textile Cost Methods.

(*Continued from page* 86.)

& Company, Mr. Loper explained that his criticism of distributing the overhead on the percentage of labor applied to those mills where the total payroll of the whole plant is divided into the total overhead. He declared that such a method gave ridiculous results and that an accurate distribution of the overhead for each department was essential.

Replying further to a question by Mr. Branson, Mr. Loper pointed out that where the overhead is accurately distributed through the departments it would be possible to find the ratio between labor cost and overhead varying from 35 per cent to 250 per cent within the department.

The remainder of the discussion, which was very limited as to time because of other features on the program, continued in the same general manner, the mill men asking questions and Mr. Loper replying and further elaborating on the points brought up.

American Ass'n. Convention Date Changed.

Announcement has been made by Secretary-Treasurer Winston D. Adams, that the dates of the annual meeting of the American Cotton Manufacturers' Association has been changed to Friday and Saturday, May 26 and 27, instead of May 23 and 24, as previously announced. The convention will be held in Washington, D. C., and the headquarters will be at the New Willard Hotel.

This change in dates was made at the request of Secretary C. B. Carter, of the National Association of Hosiery and Underwear Manufacturers, who suggested that the American Association meeting be postponed one week from the dates originally set in order that the members of this Association might be enabled to attend the Knitting Arts Exhibition that will be held by the National Association of Hosiery and Underwear Manufacturers in Philadelphia during the week of May 22, and the dates first designated by the American Association would have conflicted with dates of this exhibition.

The change in dates received the approval of President L. D. Tyson, and with the American Association convention on Friday and Saturday, May 26 and 27, those of the cotton manufacturers who desire can attend the Knit Goods Show and then go to Washington for the meeting.

"The Board of Governors selected Washington as the meeting place for the American Association by reason of the fact that quite a number of important problems will then be pending to which we desire to give special attention," says Secretary Adams.

The Boston Textile Exposition

The exhibits of textile machinery, supplies, specialties, and products, together with the supplementary exhibits of power plant equipment, that were shown at the Mechanics Building in Boston during the week ending November 5th, were more complete in point of number and interest than have ever before been gathered together in one exposition.

The fact that it was the first show of its kind to be held in that city since the Spring of 1916 aroused a vast amount of local interest and a very large number of local people attended in addition to the many visitors from the smaller New England communities and mills. There was, also, a very reasonable number of southern mill men in attendance when consideration is given to the long distance it was necessary for them to travel and the present condition of the industry. As a result there were times when the building was too crowded for comfort although the interested mill man could always get inside the railings for a closer inspection and explanation.

Almost ideal weather conditions prevailed during the entire week, something to which the exhibitors at former shows, which were held in the Spring months, had not been accustomed, thereby causing much comment.

With one or two exceptions no radical changes in machinery and equipment were displayed. There were, however, numerous improvements in detail to be seen on many machines and some specialties were exhibited at this show for the first time. However, as most of these have been described in COTTON'S pages in a more or less complete manner, descriptions of individual exhibits have not been prepared and the space that is usually devoted to this duplication of effort will be used for other matter of more immediate interest to the reader.

Some good sales were reported as being consummated at the show and a large number of inquiries were developed. At least one southern mill man was looking over the situation with a view to purchasing the entire equipment for a 25,000-spindle mill and there were rumors of others who had the purchase of comparatively large quantities of equipment in view. How much of this business materialized is only known at the present time by the principals concerned.

One of the pleasant features of the show was the publishing and distribution of news bulletins by the staff of the Daily News Record of New York. While this feature has been worked at previous shows, the items this year showed more care in their preparation and were more newsy and interesting than usual.

Another feature of this show was, that in spite of its great size, the exhibits were practically all ready for display on time. If arrangements could have been made to have had electric current on the building on the Sunday preceding the opening, probably all the moving exhibits would have been ready for demonstration when the doors were opened at two o'clock on Monday afternoon. But as it was there was very little delay, so little that the average onlooker could not tell the difference.

Chester I. Campbell, the manager of the show and the secretary-treasurer of the Textile Exhibitors Association, was quoted as saying on the opening day of the show: "Today marks an epoch in educational exhibitions. To be truly successful an exposition must bring together the manufacturer, buyer and consumer. All three are important factors in the success of any undertaking of this nature. I feel sure that the International Textile Exposition opening today will carry its message to all parts of the world."

Among the visitors were noted many foreigners, particularly Japanese and Chinese. At the booth of the Bureau of Foreign and Domestic Commerce, clothing made from paper by the Germans and Austrians was on display. The exhibit included suits for men, coats, women's aprons, table covers, window curtains, and hand bags. Government representatives gave information on the manufacture of these and other articles on display to those interested.

Interviews with many exhibitors brought to the foreground the general satisfaction that all seemed to feel toward the show as a whole and the way in which it was conducted, and also developed the fact that in several instances there are newly designed or redesigned machines being worked out that had not been sufficiently tested in practice to be placed on exhibit. It seems probable that by the time the next show at Greenville comes around, these will be ready for inspection and demonstration.

The show was indeed a great success.

Boston's Opportunity.

A suggestion for a better exhibition hall was made by C. W. Schaum of Philadelphia, one of the exhibitors at the recent show, that seems worthy of the thoughtful consideration of influential Bostonians.

It is Mr. Schaum's idea to dismantle the larger part of the present Mechanics' Building, retaining only the basement for power plant and storage purposes and erect on the same foundations a single story fireproof structure, arranging with the Boston and Albany railroad adjoining to extend this single story structure, on suitable supports, out over the Boston and Albany car storage tracks to any extent that might seem advisable to secure the necessary floor space.

Such an arrangement would give a fireproof structure, with a strong, level floor of an area suitable for the largest expositions. All exhibitors would be on one floor giving all an equal chance in the showing of their products. An elevator located at the railroad tracks would facilitate the loading and unloading of heavy machinery directly to and from the cars to the floor above. The many curious corners in the present building could be obliterated in redesigning the structure and a modern exhibition hall developed in a location that is admirably suited for the purpose.

Spinners Meet for Discussion at Gastonia

They get better all the time! Each one of those sectional meetings that are being held by the Southern Textile Association seems to surpass the previous one, and the meeting of spinners that was held in Gastonia, N. C., on Friday, November 18th, was no exception.

There was a fine attendance of mill men, superintendents and overseers in the main, from all sections of the South. They came to Gastonia to discuss the problems of the spinning room and how they can make better yarns. They came with a desire for information and they came with a willingness to help, a spirit of cooperation. The free and positive expression of these made the meeting a successful one, and one that gave indisputable evidence of the value of such gatherings and of the fact that the mill men of the South are realizing the opportunity offered in these sectional meetings.

There were two sessions of the spinners' meeting, a morning session and an afternoon session, and these were held in the assembly hall of the Gastonia Chamber of Commerce.

The Morning Session.

The meeting was called to order at 10 o'clock by James A. Chapman, Jr., of Inman, S. C., who is chairman of the Board of Governors of the association, in the absence of Gordon A. Johnstone, the president, and F. Gordon Cobb, the general chairman of the sectional committee.

After a few preliminary remarks, Mr. Chapman turned the meeting over to Carl R. Harris, of Lancaster, S. C., the chairman of the association committee on spinning.

The first question brought before the meeting for discussion was that of uneven yarn. "One of the main things that has been receiving attention of late," said Mr. Harris, "is the unevenness of yarn. We see a great many articles written on the subject of uneven yarn, where the writers give lists of the things in the different rooms that cause this unevenness, and yet we know that the man writing these things has just about as much trouble with unevenness in his yarn as anyone else.

"I think it would be worth a good deal if we could come to some conclusion as to what is causing the greatest unevenness of yarn in southern cotton mills today, and we would like to have some of you gentlemen express your opinion on the subject."

There were no responses, and Mr. Harris continued, "We all seem to have about the same feeling—what is causing the unevenness? Can it be brought down to the one thing—carelessness? As a matter of fact, is our unevenness in yarn due to carelessness?"

In response to the further request of the chairman as to how much variation is going into yarns, Mr. Chapman, of Inman, said that recently he had made some inquiry as to what would be an allowable variation in 30s yarns, and the reply summed up about as follows: two per cent on cards, one and a half per cent on drawing, one per cent on slubbers, a half of one ptr cent on intermediates, and no variation on speeders.

Mr. Chapman added, however, that he had received no replies from his informants as to how such a small percentage of variation can be accomplished.

Continuing, he reported some tests he had made at his mill in this connection, saying, "Over a period of two or three weeks, on 30s, we weighed bobbins from every side in the mill, and found that we had a variation of 15.40 per cent. Of course, we would have some very light and some on the heavy side, but we took that into consideration. On 41s it was 17.25 per cent."

Mr. Chapman was asked what was the greatest variation in any one day, and the reply was that it was three or four numbers.

"Speaking of uneven yarn," said Mr. Edwards, of Lancaster, "I have never found a remedy to stop it. Mr. Chapman gives a record of 15 per cent variation on spinning. I think this a very good record. In all my 20 years experience in the mill, I have never found any under 15 per cent. Of course, some of them run about 5 or 6 or 7, but the majority of them are running from 15 to 20 per cent variation in numbers. I am right now having the same thing as Mr. Chapman. It doesn't run that all of the time, but it will average right around 12 to 15 per cent."

Replying to a question, Mr. Edwards stated that his yarns were carded, and continued, "We are doing everything we can to keep the cards and drawing going right. I believe that is where the biggest trouble of uneven work lies. If it is made right through the pickers and cards and drawing, it will run right from there on. If you have uneven laps and drawing sliver you will have uneven work in the spinning room. If you get it right in the preparatory processes, the others will run pretty near right."

At this point the chairman stated that he would like some expressions from some of the fine combed yarn spinners in this regard. "What are you doing to stop the unevenness?" he asked. Arthur M. Dixon, of Gastonia, was called upon for a statement in this connection.

"In regard to unevenness, do we understand you to mean, for instance, thick and thin places in the yarn, or variation in numbers of yarn?" queried Mr. Dixon. It was explained that the idea was that, for instance, if a mill making 30s is running with a variation of three numbers, then the variation would be ten per cent. Then Mr. Dixon continued, urging the men to take part in the discussions, as follows:

"This association will never accomplish anything if everyone is afraid to say something. Don't be afraid to get up on your feet and speak out. A whole lot of fellows won't say anything because 'some of the other men will say he is a damn fool.' All of us make mistakes; I don't believe any of you make as many mistakes as I make.

"In regard to variation, we all know that a great many orders read that they are subject to cancellation if the variation is over two per cent. That's a pretty knotty problem. If a man can keep his numbers within two per cent, I would call him a hero and a soldier. I have had dealings with one concern who said they would not take yarn calculation weight. With the variation around two per cent, on 40s two-ply, on a 10,000 pound order, that would be around 144 pounds loss in weight that they claim. My contention was that if the yarn was within two per cent, they didn't have any kick coming. We all allowed two per cent, by general agreement, and if they had a variation over two per cent, then I would be willing to allow them a claim on all over that.

"I saw the gentlemen in question and took the matter

up with them in person. I told them that I presumed they would be willing to pay for any excess weight over calculation weight, and they said they would and I was to refund them for any under weight. In the case of ten per cent, those warps that should have weighed 135 pounds would have weighed only 122 pounds, which would be mighty low."

"I didn't mean to say that the beam weight would vary that much," explained Mr. Harris, "I had reference to the individual sizings—if 30s yarn sized 27s at one place and then a little further down was, say, 31s, there would be that much difference between the high and low. What can we do to fight things like that?"

"The question of uneven yarn is such a big problem that it is a hard thing to approach," resumed Mr. Dixon. "We know it can begin in the pickers, and for every process following there is a chance to make uneven yarn. On every process up to the spinning frame you can find a chance to make uneven yarn. We get variation in diameter as well as weight in yarn. It is not only the difference in weight, but it is also due to the fact that it is not a round, smooth yarn.

"The point I want to emphasize is this: let us get on both feet at these meetings and say what we have to say. We all make mistakes, and we will never get anywhere if we don't get up and talk. The time has come when cooperation is necessary, and it behooves us all to get together and cooperate and progress. That old thought that a man could live unto himself alone is out-of-date. That time has gone, gentlemen. Some of the fellows used to think they had something or were doing something nobody else knew about, but everyone would soon find it out, and the man himself would generally be the last to learn that everybody knew it."

Mr. Dixon then referred to the discussion at the recent Charlotte meeting on the statement that the New England mills are making better yarns than those in the South. "I made the statement that I thought in a great many instances, in the past, that they had done this," said Mr. Dixon, "but I believe in this day and time that some southern manufacturing concerns are making just as good yarns as are made in New England. And I believe that as each day passes by you are going to see more mills in the South making better yarns than they made yesterday, or last month or last year.

"The only way we will get results is by communing and cooperating, one with another. We have the help, we have the machinery and the managers, and there is no reason why we cannot succeed."

"I think Mr. Dixon's idea of cooperation is one worthy of our consideration," said Mr. Harris, "It has been conceded that New England could make better yarns than we could—better yarns means more even yarns. What causes the greatest unevenness in yarns in southern cotton mills? That's the point we want to get at." He then called on Marshall Dilling, the chairman of the committee on carding, for a statement in this connection.

Mr. Dilling replied that one of the main points brought out in this connection at the carders' meetings is that the mixing of the cotton has a great deal to do with the evenness of the work. "We all concede," he said, "that the English spinner has an advantage on the American, and this is because he gives his cotton a better mixing. If any one has made any tests along that line I am sure we would be glad to hear from him. All carding subjects are, after all, spinning subjects. That is why we card better—to make good yarn. You cannot make even spinning unless you have even roving."

"Since the carders' meeting in Columbia, we have installed an opening room, and open the cotton up, but up to the present time I cannot see any difference in the variation of the yarn because of it," replied Mr. Edwards, of Lancaster. In answer to various questions from the floor, he stated that they feed the cotton from the opening bin to the hoppers; that they let it stay in the bins about 24 hours, or just as long as they can before they need it.

Mr. Chapman asked Mr. Edwards concerning the method of opening, and the reply was that they open the cotton and throw it into the pile and let it lie until it is needed; they use local cotton mostly, he added.

J. A. McFalls, Gastonia, suggested, "If the gentleman would tell the members something about the carding equipment and processes he is running they might be able to help him."

B. R. Burnham, Whitney, S. C., said, "One part of this discussion has interested me. The gentleman said a little while ago that better yarns have been made in New England. I want to tell you as a New Englander that this was not done through cooperation. I would like to ask a question, if I may: How many mills are represented here where I, or any superintendent or overseer or anyone else can go and get the superintendent's permission to go through the plant?"

The nature of the responses to this question indicated that it is general practice in southern mills to allow any inspections of the plants desired. Dixon, of Gastonia, seemed to sum it up by saying, "I represent two mills, and any one is welcome to visit these mills at any time."

"I believe that these sectional meetings can do a great deal of good if we can open up the avenues into the mills," continued Mr. Burnham. "So far I have never been turned down, but I know some people who have."

Picking up the thought expressed by Mr. Dilling, Chairman Harris said, "As Mr. Dilling has stated, what we want to get at and establish is whether we are using as good an opening as we should; whether our unevenness is due to our machinery; or whether it is due to pure carelessness. There is something that is doing it, and if we can whip it out at this meeting, we will accomplish something." Referring to the suggestion made by Mr. McFall, the chairman added, "That is a question that every individual must bring up for himself. If everyone will get up and state what equipment he is running, probably he will get some information that will help him and help the rest of us too. Can't we hear from someone who has done something to eliminate unevenness?"

Taking up this idea, L. A. Funderburk made the following statement:

"Some time ago we got some kicks on variation in our yarn—this was 30s hosiery yarn, and I took all the steps I could to make it better. I have found some as much as three numbers off, but about one and a half to two numbers is our variation.

"We tear the cotton up by hand and blow it into the picker room. We had two processes of pickers, and we

thought that probably our pickers were causing the variation, but we watched them, and could not catch any laps that ran over the ¼-pound variation that we allow in our laps each way. Then we decided to put in three processes of pickers with the hope of making the work better.

"We have a small mill, running day and night, and I started in making the intermediate laps at night and the finished laps in daylight, and I found that it helped the work 35, and in some cases at least 50 per cent.

"However, we have a small mill and I try to grade every bale of cotton that comes into the mill and watch it very closely.

"I have found that variation in staple causes more uneven yarn than anything else. I think if everybody would be more careful about the staple it would be better. We use 1 1/16 cotton, and I try to get full 1 1/16 inch, but occasionally some will get by and cause trouble."

David Clark, Charlotte, asked Mr. Funderburk concerning the method he used to determine his variation. "We reel four bobbins at a time from different frames," he replied.

Mr. Clark said that observation had shown him that this practice was probably doubtful in its merits. "The people who have been doing this research work in the North say that this is not a test at all," he continued. "They say take an entire spinning frame and size all the bobbins." Two superintendents in the South who have made tests in this manner, he declared, haven't found less than eight numbers variation down the side of a spinning frame.

He stated that Mr. Boyd, of Charlotte, who was not at the meeting, had to his knowledge made tests in this manner, and a report from a representative of Mr. Boyd's organization indicated that in testing 245 spindles at a time, on 51s, it had been found that the bobbins ran anywhere from 40s to 57s. This was with band driven machines.

"We did not make any tests in this manner exactly," added Mr. Burnham, "but we sized nearly a whole side of 192 spindles, and on 14½s filling we got a variation of 1½ numbers. One thing we did, though, may have had some effect on it. We changed the drafts and twist, slowed the spindle speed in the card room and took out some twist."

"I have in the last six months sized 112 bobbins," stated J. T. Phillips, "and out of these 112 bobbins I got a variation of about 5½ numbers, running on 1 1/16-inch cotton, making 23s. About two years ago I made tests of the same kind in another mill, and the spinner there is here this morning—he is Mr. Williams of Winnsboro—and I believe he will bear me out. In the testing at that mill I got about five numbers variation—this was on 26s running 1⅛-inch cotton—but it wasn't over five numbers."

Mr. Williams, of Winnsboro, was the next speaker. "We are making some tests at Winnsboro," he said, "and have gone far enough to get a very good idea of the variation. We size four bobbins from each frame of 171 spindles, and I find a variation of anywhere from 26s to 23s."

"The gentleman over there spoke of having a variation of about five numbers. On coarse numbers, five numbers would be a very big variation," suggested Mr. Dilling.

"What I meant by that," explained Mr. Phillips, "was this: we would have probably 25 bobbins that were 24s, say, and maybe one that was 19s. (Mr. Phillips was referring to 23s yarn.) I did not get the percentage, but I think it actually averaged around 22.70s."

The chairman asked the following question, "Mr. Phillips, to what do you attribute the cause for having 19s yarn in 23s?"

"I am not a practical carder," replied Mr. Phillips. "I'm a spinner. But I believe the trouble preceded me. If you make it right up to the spinning frame, it will not have much variation there."

Mr. Wofford—a spinner—of Inman, said he had made some tests by weighing roving bobbins empty (nearly run out), half-full, and full, and reported that he got a different weight off all of them. "I would like to ask the carders: why is this variation?"

The next speaker was C. H. Goodroe, one of the pioneer superintendents in the association. He said in part:

"I have never gone through any tests as to what would make uneven yarn except a life-time experience. All of this unevenness is brought about more or less from carelessness. To start right and stay right, you can make just as good and even yarns as they make in the East or the North or the West or anywhere else.

"So many things make uneven yarn that you would have to go through the entire category to find out what was wrong. I have found that when a man gets a little wrong himself things will go badly, and when I get that way I open up and go through the deal with the boys and then the sun begins to come out.

"I remember back in 1896 when we were fighting for a reputation for southern ring spun yarns. We would mix about thirty bales of cotton a day and we would not flake it off and throw it in the bin—we would tear it up.

"I thought we were going along very well, but the numbers would not come even and right. I found that the draft on the pickers would not throw it on the screens like it should. Then I went through the drawing.

"In the card room, an honest grinder is one of the best things you can get. If the stripping plates are set right, and you know they are set right, it will help a whole lot. If the card is clean it will not fill up so quickly, if it isn't there is unevenness.

"Going back to the pickers, I set the draft on each side of the screens so that the cotton would lay on the screens in the proper place.

"One of the worst things we have in southern cotton mills today is indifference. I would not care a cent about a pound on the lap or anything like that if I knew the fellow doing the work was honest. But, when you come up to the drawing, and you see an indifferent drawing frame hand handle the work so a singling will go through, then you go to the spinning and see that singling come through as a thread as long as Gastonia. The thing that does you up is carelessness and indifference. If it is not watched and prevented, bad work will result."

"We are discussing this uneven yarn question," Mr. Dilling pointed out when Mr. Goodroe had concluded, "and are throwing the blame on the carders. And that is where most of the unevenness comes from—we admit it. And I want to make an announcement here. At the next carders' meeting we want to ask the carders, and spinners too, to get a report on the variation of their card sliver. If it varies 50 per cent, you report it; you won't be the only one. You get an honest report and I believe you will be sur-

prised at the variation—both before and after stripping. We want a number of these reports.

"What I started to speak of was this: it has recently been called to my attenion that a certain mill was having trouble with uneven yarn and they called in a man to make an investigation. He found that the drawing frame top rolls were not properly lubricated. Previously the oil holes were not large enough to allow proper lubrication, so the rolls were taken to the shop, and the oil holes re-bored and made larger. This one point of lubricating the rolls from one end to another was enough to change the tension so that it could be noticed. That can be true of any frame in the mill, and that is one of the greatest sources of uneven yarn on spinning frames today."

Being called on for a statement, H. G. Winget, of Gastonia, said:

"I have not had so much trouble with uneven yarn. For a while we were troubled, and I would talk to the card room man and he would say that the spinner was not doing so-and-so, and then I would go to the spinner and he would say that the card room man wasn't doing this or that. At that time they were sizing at separate places in the mill, and I moved all the sizing together, and then as soon as the card room man sized it the spinning room man would know just what he did. I have not had any trouble with variation since I got them to sizing together. There was no reason for it except carelessness in sizing. Now each one of them knows just what the sizing is.

"Along the line of carelessness in the mill, I believe our present employment system has a great deal to do with it," continued Mr. Winget. "You can take any business in the world except the textile business, and they all have better methods for selecting their help. If a man comes to us and says he is a speeder hand, we hire him if we need him without finding out whether he is a good man or not, without learning anything about him. Take a bank, for instance, they would want to know whether a man is honest or not. But we take the man and do not know what positions he has been in or what he has been doing. Our duty, as I see it, is to instruct the man how to do his work.

"A lot of uneven work is caused from poor piecing made on speeders and other places. It is the fault of the superintendent if he doesn't get in behind his overseers to see that the help are properly told about it. There are as many kinds of mills as there are birds. In some mills piecing doesn't make any difference, and if you put a man out of one of these mills into a fine combed yarn mill, he is not altogether to blame if he does not do his work properly. The responsibility lies with us as superintendents and overseers, individually, to see that these things are right.

"You know, around Gastonia our present system of employment is very lax. If a man comes to our mill from Mr. Dixon's mill we don't ask him why he left the other mill. If we need him we go ahead and put him on without asking any questions. This is a serious thing, gentlemen, and there is no doubt about it. There is no reason in the world why any man in a mill shouldn't be a good hand, and we are responsible. If we are lax in our management we must expect to have lax hands.

"If a man is a good hand and he is the right kind of a fellow, he doesn't mind telling you why he left where he was, and if you don't believe it, you can easily find out from the other man. But we have a certain element of help that is always on the move, and in a whole lot of cases if you trace down why they left you will find it was on account of bad work. Why, I have known families to move to 'change stores' so they wouldn't have to pay a grocery bill.

"It is up to us to make better hands out of these people. It is our duty and we are individually responsible for it. We cannot do it all in a day, but it takes the cooperation of everyone to take a new family in the mill and train them right, and it should be done. When we get a complaint on our yarn, it doesn't come to the drawing frame hand; I notice it's generally marked 'Attention, H. G. Winget.'"

David Clark remarked that Mr. Winget's talk brought to mind something he had seen while attending the textile show in Boston. He said that the B. B. & R. Knight Corporation has had some moving picture reels made showing the various operations in manufacture, showing the incorrect way to piece up an end, for example, and then illustrating the correct way to perform the operation. They have taken films of operations all through the mill, from the picker room to the weave room, and are showing these films to operatives in the mill for educational purposes.

For example, the effect of putting up a hard end on the roving frame will be shown in the spinning. Good results are reported from this work, as it brings to the attention of the operative the disastrous effect that careless work on his part will often cause in later processes.

Two men are now coming South with these films, said Mr. Clark, and they will be shown to groups of operatives in different southern mill centers.

"Can't we hear from some of the fine yarn spinners in regard to unevenness of yarn?" prompted the chairman. "It looks like after we boil the whole thing down we bring it down to the one thing—carelessness."

Mr. Goodroe brought out the point that humidity is one of the greatest things in cotton mills today, and that much depends upon keeping it properly regulated. The chairman continued, when Mr. Goodroe had finished, "I labored under a false impression in regard to humidity for a long time and no doubt others have been in the same fix. I found out that I was mistaken about relative and actual humidity. Relative humidity means nothing. It is the actual humidity, or the number of grains of vapor in a cubic foot of air, that counts. Now, what is the best degree of temperature for a spinning room in order to get the least variation in weight?"

Mr. Goodroe recommended between 70 and 75 degrees. He pointed out that generally a man can judge the temperature by his own feelings—that is, tell about how much humidity is in the room, and whether it is the correct amount.

M. T. Poovey, a fine yarn superintendent of Gastonia, made some interesting remarks in this connection. "I have made some tests on humidity in different sections of the country," he said, "at a mill I was with in Alabama—at Huntsville—and while I was in Tennessee for about six years. I kept a close record all the time, three times a day, and I kept the wet bulb about 65 and the dry bulb at about 85. After a while, though, I got so accustomed to it that I could judge the humidity just by breathing.

"I think that the different sections of the country require different amounts of humidity. I know at the mill in Alabama, when we got a South wind—I would notice the smoke from the smoke-stack as I went to the mill—that we

always had bad running work. If the wind was from the North it would be all right. When we had a wind from the South, I would close all the windows on the South side of the mill and open those on the North side. And I would like to say that I believe the adjustment of the windows is a very important thing about the humidity. A number of mills have skylights in the ceiling, and they adjust these, but you can open the windows and skylights to the place where they will take the humidity all out of the room and you won't get the benefit of the humidity down on the spinning frames.

"At my present mill," Mr. Poovey went on, "I am running half comber waste and half cotton. Now, all you men know that with comber waste you've got to have water —plenty of humidity. If you get a North wind and it is very dry, the spinning will be all balled up.

"I would like to get some information this morning on comber waste. When I first began to use it, I used comber waste from 1 3/16-inch cotton, and cotton from 7/8 to 1 1/16 inch, and I was balled up all the time. We decided we would try to match our staple in the comber waste, so we put in 200 bales of Mississippi cotton. This was a soft cotton that corresponded with our comber waste, and since we have put that in, our spinning has improved 60 per cent, but still I want to improve it some more.

"I am running on 20s yarn on 8,500 r.p.m., but I cut down to 6,500 and took out five teeth of twist, and by that change I gained 11 pounds on the breaking strength. It was so good that I have ordered pulleys to cut the spindle speed down and take out some twist, which will give me one revolution less on the spinning rolls."

"What twist did you have before and after changing, Mr. Poovey?," asked Mr. Dilling.

"We were running about 4.75 times the square root, and then we cut it down to 4.50 or less," was the reply.

"That is a point of vital importance," continued Mr. Dilling. "That is, what effect the twist has on the breaking strength of the yarn. I reported a test along this line at the Spartanburg annual meeting, not only showing the effect on yarn, but also in roving." (This report was published in full in the June, 1920, number of COTTON.)

Mr. Harris stated that there has been some question as to whether putting in more twist in the roving will increase the breaking strength.

"I would like to state," reported Mr. Dilling, "that in all of the discussions at our different carders' meetings, I think everybody agreed that when they had taken out twist it had increased the breaking strength. You must remember, however, that you can take out excessive twist. I remember at the last spinners' meeting a man from Shelby—I see him sitting over there now—gave some mighty interesting information along this line, and we would like to hear from him today."

E. P. Knowles was the gentleman referred to by Mr. Dilling, and on being asked for a statement in regard to the relation of twist to breaking strength, he said:

"I'll give you a little experience I had week before last. I was putting in 4.92 times the square root on 30s, and I took a frame and put in 4.50 times the square root, and this beat the 4.92 about five or six pounds on the breaking strength."

"About what spindle speed did you have with the 4.92 twist?" asked Mr. Burnham. Mr. Knowles replied he was running 9,642 r.p.m. Mr. Burnham then asked if it was necessary to cut the spindle speed with the change in twist, and Mr. Knowles replied, "I didn't touch the spindle speed."

"I made some tests along that line," said Mr. Burnham, "and I found I got better results by cutting the spindle speed. We are not down to 4.50 yet, however."

"I reduced my spindle speed from 10,000 to 8,800, and took out five teeth of twist, putting it down to 4.60, and I found I got a better luster and a stronger yarn," said J. A. McFalls, of Gastonia. He uses 1 1/16-inch carded cotton, he added in response to a question.

"About four years ago I took the superintendency of a mill in Gaston County," declared Mr. Poovey, "and when I went to this mill they were running 1¼-inch cotton on 40s—making reverse twist yarn—and the breaking strength was down so low that they could not sell the yarn. We tested out everything we could think of that would cause the breaking strength to be down, and finally came to the conclusion that it was in the cards.

"I had a friend who was overseer of carding in an Alabama mill, and who I considered one of the best carders in the country. He was passing through this section and stopped off to visit me, and I asked him to go over my cards for me. He went through the card room and set up the cards like they should be set. He set up two cards and gave me the settings and I had the others set up just like those two. This one thing increased the breaking strength on the 40s over 30 per cent. I think that mill is now making the best reverse twisted yarns in Gaston County, and it was all brought about by having the cards set up right."

"I'll tell you something that happened just this morning, before I came over," said Mr. Knowles of Shelby. "We had the night man size some yarn made with the 4.50 twist and it sized about 30.37 (this was 30s yarn) and it broke at 59.07. This is from local one-inch cotton.

"Now about the spindle speed," he added, "I think my spindle speed (9,642 r.p.m.) might be a little high. It might be well to run a little less than that regularly."

C. C. Briggman, of Lancaster, asked the question, "Does Mr. Knowles break his yarn by hand or does he use an automatic machine?" Receiving the reply that this was done by hand, Mr. Briggman continued, "There is all the difference in the world in the automatic machine and breaking by hand. The experts are recommending that the automatic machines run at twelve inches a minute. This is very slow, but with the hand machine, the machine runs sometimes slow and sometimes fast, and a man can make a yarn break wherever he wants it to." Mr. Knowles arose and explained that he had sent some of the yarn made with the 4.50 twist to another point, to be tested with an automatic machine, and that it broke at 60 pounds, and sized 29.41.

"While I am on my feet," Mr. Briggman went on, "I would like to say something in connection with uneven work. In my opinion, lots of uneven yarn is caused by tension. Mr. Wofford spoke a while ago about the yarn being lighter on the empty bobbin. In my opinion the carders are running the tension too tight on the empty bobbin. You are stretching the roving; 75 per cent of the roving that breaks back is on the empty bobbins or on those less than half full, hardly ever on the bobbins over half full. It is because you are running the tension too tight. As I say, that is one of the things that causes uneven yarn."

Referring to the question brought up earlier in the meet-

ing concerning methods of sizing bobbins, Mr. Briggman continued, "I never weighed the whole side of a frame, but I have always used eight bobbins in making my tests, and I take these from the freshest roving from the carding. Sometimes I find on 30s it will run from 29s to 31s, and then sometimes it goes from 28s to 32s.

"In regard to humidity, we at Lancaster have tried to specialize on this point," stated Mr. Briggman. "I find that when our dry bulb is between 75 and 80 and the wet bulb about 80 that we get the best results. We have tested about 5½ inches of vapor and we get our best results here. If you have the Cramer automatic control it will do it itself."

Mr. Goodroe declared that "twist is one of the biggest boons to the size manufacturers." He said that many mills will put in a large twist, and then use larger amounts of size than are necessary trying to get it to penetrate the yarn in the slasher. He said that though he thought all the size men were his friends, still too much twist sells a whole lot of size for them. Oftentimes, he said, the mill man doesn't realize that the trouble can be caused back in the pickers—that if the work at this machine runs badly it will come out badly all the way through. "I would like to see ball bearings on every picker in the country," he said.

At this point, Chairman Harris said a man had given him a question in regard to draft that he would like to have discussed. This man is having trouble with his roving pulling through, said the chairman, and he wanted to know, "Is a draft of 9.80 on 30s warp too short?"

Mr. Knowles expressed the opinion that this draft is too short for the work in question. "I have some 30s spinning," he added, "and have a draft of 11.94. This is perhaps a little long, but I think 9.80 is too short."

Mr. Poovey recommended that the gentleman in question bring his draft to 10.50 and take out some twist.

"We spinners always like to take out twist," suggested a spinning overseer. "That would be what we would recommend—taking twist out of the roving."

The chairman then brought up the specific question, "How many present are running 30s with a draft less than 10?"

Responses were received in the affirmative from three men. Mr. Ballard said he is getting good results with a draft of 8.65 on 30s single roving, from 1 3/16-inch cotton.

In this connection, Mr. Dilling said, "Some time ago I was making some numbers that did not have good breaking strength. I had a draft of 13, and changed the roving for a draft of 11, and increased the breaking strength about 12 pounds or 20 per cent."

Mr. Chapman said they had been running a draft of 9.92, and had a front roll speed of 108 r.p.m. with a spindle speed of 8,500. On filling, 40s, he stated, they had a draft of 11.50, but that they were short of spindles and had to do it. He said they went down to the card room and made light roving and reduced the draft to 10.50, and managed to get through all right with a front roll speed of 102 r.p.m. They use local cotton.

"Which is best, running the filling traverse up slow and down fast, or down slow and up fast?" was the next question brought up by the chairman. He asked how many were running the traverse up slow, and called for experiences in this connection.

One man said that he has tried it both ways, and that he never runs the traverse down slow without having the yarn slough off in the weave room. This applies equally to fine and coarse numbers, he added.

After having the cams turned in a way that the traverse would go up fast and down slow, and vice versa, stated Mr. Briggman, they had found that when the upward motion is slow it winds the yarn on and the downward motion packs it.

"I once had charge of a 50,000 spindle mill on sheetings," said Mr. McFalls, "and we had trouble with the filling knocking off in the cloth. We made the traverse go up slow and down fast and had no more trouble."

Mr. Nims related the next experience along this line. "I had an experience in a 45,000 spindle mill running on 30s warp and 45s filling. When I first went to that room the traverse was going down fast and up slow, and they were having trouble with the filling knocking off. I changed the whole room—on the filling—and made the traverse go up fast and down slow, and we got better results, and the filling ran off on the looms all right. The reason was that when the traverse is going up slow there is more pull on the yarn. If the traverse is going up fast it winds a bigger bobbin. Run the traverse up fast and down slow."

"The reason I got the idea that you should run the fast traverse downward was because of the change at the top of the bobbin," explained Mr. McFalls. "It changes quicker and doesn't make any slubs. If you run it up fast it will put a strain on the traveler."

The morning session adjourned at this point, following an announcement by Chairman Harris that the theme of the afternoon session would be modern improvements in spinning machinery.

Luncheon.

The regular "Dutch" luncheon of spinners was held in the First Baptist Annex at 12:30 o'clock, after the mill men had been snapped for a photograph, a nice meal being served by a number of Gastonia ladies. I. B. Covington, superintendent of the Florence Mills, Forest City, N. C., returned thanks. Pleasing music was furnished during the meal by the Glee Club of the Gastonia Chamber of Commerce and the quartette from the Kiwanis Club of Gastonia.

A. G. Meyers, prominent banker and manufacturer of Gastonia, welcomed the visitors to the city, and James A. Chapman, Jr., responded in behalf of the association. Talks were also made by A. B. Carter, Arthur M. Dixon and Marshall Dilling.

The Afternoon Session.

At the beginning of the afternoon session, which convened in the assembly hall of the Chamber of Commerce at 2:15 o'clock, Chairman Harris brought up the subject of the relative merits and demerits of the tape drive and band drive on spinning frames, asking the question, "How many here are using tape drive on spinning frames, and what are your experiences?"

Mr. Storey, a Gastonia superintendent, one of those who indicated they were using tape drive, on being called upon, made this statement:

"We have the improved Whitin frames with tape drive and the old style frame with band drive, and it seems that the yarn made on the tape-driven frames is a more even yarn, a little evener in twist and a little bit closer in numbers, and is a little more desirable on the market. I also

took out four teeth of twist on the tape-driven frames, and increased the breaking strength. I think the tape drive has an advantage over the band drive in the smoothness of the yarn."

"The gentleman said he got a little evener yarn and less variation," observed Mr. Chapman.

"I couldn't say for sure about that," replied Mr. Storey, "on account of the tape drive machines being the newest.

"I find that if the lower roll is running parallel with the steel roll, it will make an evener yarn,' he continued. "If you can find rolls all down the frame running a little out of line, there will be a difference in the yarn. That condition is caused in a great many cases by the journal or saddle of the roll wearing out. Sometimes the roll bearings are not set up right. If they are not watched pretty closely you will get uneven yarn."

Mr. Wofford, of Spartanburg, said they get two turns more on the front roll with the tape drive than with the old frames. All his tape-driven frames are on filling, he added. "I cannot say much about the smoothness of the yarn," was his reply to a question. Mr. Macomson, of Spartanburg, said they took four teeth of twist out of the yarn on the tape-driven frames, and two teeth out on the band-driven machines.

Then Mr. Storey, of Gastonia, started something. He made the statement, "Our tape-driven frames make 135 turns on the front roll." This is on 30s, he said, using 1 1/16-inch staple cotton.

He started something, because this remark brought forth a veritable volley of questions on "How does he do it?"

"You fellows mustn't take this high front roll speed question too seriously, because you will find it around here," advised Mr. Dilling. "I am running on tape drive, the catalog speed is 87 r.p.m., and I am running 110 to 115 on 60s combed yarn, from 1¼-inch cotton.

"As a general thing," he went on, "you can get a considerable increase in roll speed with the tape drive over the band drive. You get a uniform twist."

"Why?," asked several voices. "Well," was the answer, "with the band drive, as careful as you may be—you may even put them on yourself—they will not stay uniform. On the tape drive the idler takes up all the slack, if you have the spindles set right and properly lubricated.

"With the band drive, some of the spindles will not run right, and you have to put enough twist in the others to take care of the slack on the spindles that do not run up to speed. With the tape drive you get a twist that is uniform."

Mr. Wofford questioned Mr. Dilling further concerning the roll speed, and it was brought out that probably there are no weaving mills getting roll speeds as high as those reported by Mr. Storey and Mr. Dilling—that the big majority of mills in the Gastonia district were fine combed yarn mills, which allowed them to use the higher speeds.

But the men seemed to be interested in Mr. Storey and his 135 r.p.m. front roll speed. R. T. LeGrand asked him, "What size ring and traverse do you use on these frames?" "I use a six-inch traverse and a 1¾-inch ring," replied Mr. Storey.

The next question brought up for discussion by the chairman was the wide gauge spinning frame, and he asked for experiences of those who run frames wide enough to dispense with the separators.

Mr. Winget, of Gastonia, indicated that he is using the wide frame, and when called upon, said:

"I haven't had any recent experience with the narrow gauge, it's been about eight or ten years since I used them. But I do like the wide gauge. It runs fine for us, on 20,000 spindles."

Another superintendent reported a similar opinion. "Your yarn doesn't balloon on the wide gauge, and you can cut your spindle speed if you like. You can get a better yarn than would be the case if it was running against the separators."

Mr. Storey said his tape-driven frames are wide gauge and the band-driven ones narrow gauge, and he attributes some of the evenness of the yarn on the former to the fact that the yarn doesn't touch separators.

"I think it would be a good idea if the Association could get enough information to establish whether the wide gauge or the narrow gauge is best—whether with a less number of spindles we could produce as much yarn and better yarn," suggested the chairman. "I would like to ask this question, Can we produce as much yarn on the same floor space with the wide gauge frame?"

In this connection, Mr. Dilling said, "I remember two or three years ago I had a friend who was going to throw out his old spinning and put new frames in, and wanted to put in the same number of spindles. I argued with him that if he would put in wider gauge he could put in fewer spindles on the same floor space and get as much production.

"My opinion is that you can put in on the same floor space fewer spindles with the wide gauge and get as much or more production than with the narrow gauge. I would like to see it tried."

"The fact that our frames on tape drive are making so much more front roll speed and the band drive is making so much less is due to that same thing," added Mr. Storey. "We take the roving out of the same card room on both frames, the conditions are exactly the same except the make of the frames."

Mr. Harris asked if anyone had thrown out the narrow gauge and put in wide gauge, but there was no response.

When the question of the clutch spindle was taken up, P. A. Smith, of Columbia, S. C., said:

"The old spindles we threw out were just about in as good shape as possible, and we were getting very satisfactory results, but we did not like the quill, and we decided on the clutch spindle. Since installing the clutch spindle I have increased the speed of the front roll, on 41s filling, from 102 to 105 r.p.m., and I am putting in 3.78 times the square root twist on the clutch spindles against 3.82 on the old spindles.

"However, due to the fact that we put in new quills, and rings and other things, I cannot attribute it all to the clutch spindle, because of the other conditions, but we did gain in production about three turns on the front roll. Also, we put in a smaller ring. My experience has been that the clutch spindle is more satisfactory, and gives less tangled yarn."

Mr. Chapman asked concerning the supply bill on the clutch spindle, stating that was the biggest kick he had heard on them.

Mr. Smith replied that at the beginning of his first ex-

perience with the clutch spindle, there were some defects, but that this last lot is perfectly satisfactory and does not give any trouble. He said that a mill near his own plant has been running the clutch spindle for about four years, and that the supply bill on them was negligible.

The chairman then asked, "How many are using the No. 1 flange ring, and what is your experience?"

Mr. Hindman, of Columbia, replied to this question as follows:

"I have been using the No. 1 flange ring over four and a half years, and my experience is this: you have more stock in it, you can use lighter travelers, and you can run the work easier and have less tangled work with less changing of travelers. I had about fifteen years experience on the same job before I changed rings, and since I put in No. 1 rings the production has been increased about 10 per cent." He conceded, on being questioned, that other factors had something to do with this increase in production.

A. M. Dixon was called on for his experience, and said, "My experience with the No. 1 flange ring has been this: everybody said they were better, so I put them on." Mr. Dixon brought out the point that for a while the No. 1 ring was considered all right for numbers above 40s, but that it is now being used on 30s and 36s.

"I would like to ask the opinion of the gentlemen as to the advantages and disadvantages of the warp and filling wind spinning. If you were building a mill to make ply yarns, what would you put in, warp or filling wind on the spinning? I realize that perhaps the number of the yarn would have something to do with it."

Mr. Walters, of Charlotte, related his experience with the two different types of rings as follows:

"We went off the No. 2 to the No. 1, making 57s warp and 72s filling. With the No. 2 ring our spinners were running from twelve to fourteen sides. They told us that with the No. 1 ring the spinners would be able to run sixteen to eighteen sides. We put them on, but our spinners are still on twelve and fourteen sides. We do get an advantage with the No. 1 ring on the travelers. We don't use nearly the amount of travelers we used to."

Mr. Mims told the following experience:

"I had a room on 21s yarn, using the No. 2 flange ring, and I changed half the room on to the No. 1 flange, and thought in this way that we made a fair and square test on each ring. I made a test in this way: I had eight frames in one row with the No. 1 and eight with the No. 2 ring. I got a boy and told him to walk up and down that alley during a whole doff, and when he saw an end down to mark it on the slat.

"After the frames had been doffed, I checked up on the marks, and the results were much in favor of the No. 1 flange ring. It was far ahead of the No. 2 in regard to ends down. There was at least 25 per cent difference in the number of ends down on the two frames, in favor of the No. 1. The No. 1 will give better results, and have given me perfect satisfaction."

The next man to give his experience was P. A. Smith, of Columbia.

"We had 51,000 spindles on warp and we changed one section of 9,000 spindles from the No. 2 ring, 1⅞ inch, to the No. 1, 1 13/16-inch ring, and ran them this way regularly for a year," said he.

When they first changed, he went on, the superintendent and others were not much impressed with it, and besides, that was at a time when they were short of help. When things got going, however, "we ran the No. 1 regularly, and after a while all the spinners wanted to get on the frames that had the No. 1 rings. That was pretty good evidence to me."

Then they began to count the ends down on the two sections, said Mr. Smith, and the results showed about fifteen per cent less ends down with the No. 1 rings.

Another man to discuss this point was Mr. Wilson, of Winnsboro. "We have 40,000 spindles on 26s yarn and use the No. 1 flange ring," he reported. "I have run the same frames with the No. 2 ring, but I find the No. 1 runs best, gives the best service, and I use less travelers. I understand also that you can get less twist with the No. 1 ring."

A gentleman asked Mr. Smith if he put in new No. 2 rings as well as No. 1 when he was making the test he reported, and the reply was in the negative.

When his mill was on the No. 2 ring, Mr. Hindman added to his statement, they paid a premium of $1.00 a week to the spinner who would run 8 sides, and now, "after putting in the clutch spindle, the No. 1 ring, and new style rolls, they run from 18 to 20 sides without any trouble, and the numbers are a little better."

The next question brought up by Mr. Harris was in regard to the practice of some mills of raising the spindle rails and putting the spindles closer to the guide.

One man reported that they had raised 26 frames about a half inch, and that the work runs a good deal better, and that they were enabled to use a lighter traveler. "The closer you get it to the guide rail," he declared, "the better. We raised ours to within an inch and a quarter of the guide. They were about two inches from the guide."

Mr. Harris said that at Lancaster they are raising the rolls to within about an inch of the guides, but that so far they have been unable to notice any difference.

On frames running on filling, declared Mr. Walker, "I find that about one and a half to one and three-quarter inches is about the best distance to have between the top of the bobbins and the guide rail."

Mr. Covington, of Forest City, expressed the opinion that "it depends altogether on the diameter of the rings. I had mine raised about two years ago, but it was because we were going to use a larger ring. I set the distance the same as the diameter of the ring."

Mr. Harris said he had noticed that recommendation elsewhere—that is, with, say, a 1¼-inch ring, to set the top of the bobbin an inch and a quarter from the guide rail.

"I find a good deal better results from a rail set one and three-quarters inches from the guide rail," was the opinion expressed by W. P. Lee, of Gastonia, when called upon for a statement. "The lower the rail the heavier the traveler you have to run, on the new model frames."

At this point a discussion was started on a subject that has received considerable attention of late—that of running warp yarn the filling wind way. In starting the discussion, the chairman asked the question, "What are the advantages and disadvantages of changing warp to filling wind?"

The first reply was from I. B. Covington. "That is something I have experimented with for a good many years," he said. "I have gone on it and then discarded it

(*Continued on page* 106.)

What the Southern Mills are Doing

Perhaps the most outstanding feature in the southern textile section during the past several weeks was the fact that approximately sixty cotton mills, together with a score of other industries, in the eastern North Carolina district were forced to curtail operations because of a shortage of water, caused by an extended drought, which resulted in the curtailment of the power supply of the Carolina Light and Power Company. This company supplies hydro-electric power to a large percentage of the mills in this section.

The general plan of curtailment among the mills averaged about two and a half or three days a week. Approximate-

OFFICE OF THE CEDARTOWN (GA.) COTTON & EXPORT CO.

ly 750,000 spindles were affected by this curtailment.

As an emergency measure, arrangements were made with the Alabama Power Company for relaying power from Alabama to North Carolina and the Carolina power company operated their auxiliary steam plant at Method, near Raleigh, N. C. This plant requires about 200,000 gallons of water for each day's operation, and this water supply was hauled to Method in tank cars.

Aided by these additional facilities, the Carolina Power and Light Company, in the early part of November, announced that they were able to furnish full service to the mills and other industries affected. Furthermore, a general rain brought the long drought to an end, and aided in the supplying of power, temporarily at least.

The North Carolina mills in the eastern section of the state were probably the most seriously affected. In Raleigh, Henderson, Neuse, Smithfield, Clayton, Sanford, Goldsboro, Roxboro, Rockingham, Lumberton, Wadesboro, Franklinton, Wake Forest and Laurinburg, mills deriving their source of power from the Carolina Light and Power Company were forced to operate on short-time schedule for about two months.

However, plants in South Carolina as well were affected by the curtailment, mills in Marion, McColl and Cheraw running on a similar curtailed schedule to that of the North Carolina mills. The majority of mills in South Carolina that purchase power secure their current from the Southern Power Company, which, it is understood, had a reserve supply of water sufficient to enable them to furnish full service during the dry season.

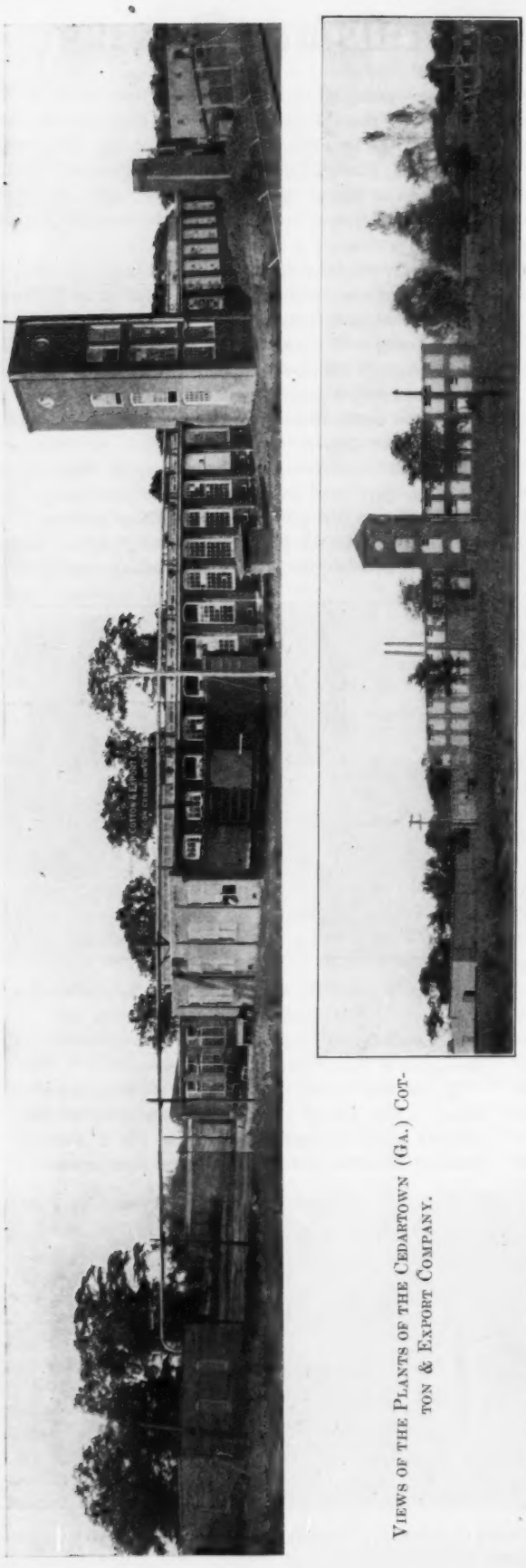
The new eight-room school building at Rockingham, N. C., has just been completed for the joint use of the Hannah Pickett Mills, the Roberdel Manufacturing Company and the Entwistle Mills, and is ready for use. Everything is complete with steam heat and all conveniences.

A BRIDGE IN THE MILL VILLAGE OF THE CEDARTOWN COTTON & EXPORT CO.

Robert & Company, Atlanta, were the architects, and T. C. Thompson & Bros. were the contractors.

A new weave shed, 423 by 132 feet; a system of warehouses; a new opener room; and a new office building, are included in the reorganization of the No. 2 plant of the Roberdel Manufacturing Company, at Rockingham, N. C.

WAYSIDE INN, CEDARTOWN, GA., OPERATED BY THE CEDARTOWN COTTON AND EXPORT CO., MANAGER KIMBALL AT THE LEFT.



VIEWS OF THE PLANTS OF THE CEDARTOWN (GA.) COTTON & EXPORT COMPANY.

The weave shed will accommodate 900 looms. An addition of 12,000 spindles, making a total of 26,500, will be made.

The Amazon Cotton Mill Corporation, at Thomasville, N. C., is planning to double the capacity of the mill in the near future.

Mills Mill, Greenville, S. C., is building twenty new houses, and other improvements are being made.

The Eno Cotton Mill, Hillsboro, N. C., is building a large addition to its mill, which will be used as a cloth room.

The Norwood Manufacturing Company, Norwood, North Carolina, contemplates the installation of additional combing machinery.

The Merchants' Manufacturing Company, LaGrange, North Carolina, plans to erect a plant for the manufacture of overall goods. Later on they contemplate the erection of a knitting mill.

The Carolina Cooperative Council, the foreman's organization of the Carolina Cotton and Woolen Mills, Spray, N. C., has begun the publication of a weekly newspaper, "The Arrow," which is being issued in the interests of the thirty-five hundred employees of the organization in North Carolina and Virginia.

The LaFayette Cotton Mills, LaFayette, Ga., held a very successful community fair during the past month.

A CORNER OF THE MILL PLAYGROUND.

There were a large number of exhibits displaying a wide variety of excellent products, those in the women's department being unusually good.

The second meeting of the second year of the Carolina Cooperative Council, of the Carolina Cotton and Woolen Mills, Spray, N. C., was held in Spray on Wednesday night, October 26. The speaker of the occasion was "Sunshine" Hawks, a 75-year-old lecturer, who has been speaking to clubs, churches and other organizations for the past half century. He took as his subject "The Golden Rule," and traced the growth and development of the textile mills of the country in recent years, praising the mill owners for the care they are taking of the employees, and making a strong appeal to the foremen to treat the men under them as they would like to be treated if they were in the men's places—the application of the Golden Rule.

At the first meeting of the year, comparative production reports of the several mills of the organization were exhibited. These reports proved very interesting, and the management has found that in showing to all the foremen what all the mills are doing in the way of production and efficiency, that a better spirit has been evidenced from the entire organization.

The North Carolina Finishing Company, Salisbury, N. C., has been granted permission by the Secretary of State of North Carolina to increase its capital stock from $250,000 to $1,000,000. The plant of this company is located at Yadkin, near Salisbury, and was formerly known as the

THE WAYSIDE LAUNDRY AND ONE OF ITS TWO DELIVERY TRUCKS.

The laundry building is 50 x 100 feet and has a complete equipment of American laundry machinery, a National marking equipment, a water softener, and Lane baskets for the work. The machinery is motor driven.

Yadkin Finishing Company. It is stated that the increase in capital stock will be largely used in making improvements and additions to the mill building and in placing additional machinery for finishing.

The Loray Mills, at Gastonia, N. C., have let contract for an addition to their mill. This addition will be two-story, 100 x 140 feet, to cost approximately $50,000, exclusive of equipment, which has been purchased.

SOME OF THE VILLAGE HOUSES AT CEDARTOWN.

The Loray only recently added 44,000 square feet of floor space, and this new space is now being filled with looms; two hundred and sixty looms will be installed altogether, and this will be sufficient to take care of the output of the yarn manufacturing plant, a portion of which has heretofore been going to other units of the same company, the Jenkes Spinnings Company. Tire fabric will be manufactured.

A controlling interest in the Chadwick-Hoskins Company, of Charlotte, which operates a string of five cotton mills in and near Charlotte, has not been purchased as was locally reported from Charlotte. The concern is capitalized at $3,800,000, and is controlled by Turner, Halsey & Company of New York. The stock purchased by the group of southern mill men was a block that was formerly held by two New York banks, it is understood.

B. B. Gossett, one of the new owners, has been elected president of the mills, and it is stated that he will move with his family to Charlotte to assume active direction of the affairs of the company. It is understood that he has turned the direction of his other numerous mill holdings over to his father, J. P. Gossett. He is president and treasurer of the Riverside Manufacturing Company and Toxaway Mills, at Anderson, S. C.; the Pendleton (S. C.) Cotton Mills; and the Cohannet Cotton Mills, Fingerville, S. C.; and secretary of the Pelham (S. C.) Mills, and also has interest in other southern mills, and banking institutions.

Spencer Turner, who retires as president of the Chadwick-Hoskins Company under the new arrangement, still retains his stock in the organization, it is stated.

No new developments in the labor situation in the southern textile industry have been reported lately, but here is an echo from the efforts of one organizer to establish a branch of the union at one southern mill. The organizer was Edward Callahan of the United Textile Workers, who is reported in a New York newspaper as having the following to say concerning the Republic Cotton Mills, at Great Falls, S. C.:

"I went to Great Falls a few days ago in company with several other union organizers. We had received an invitation to come there from a number of workers and were told that there was a great demand for organization of a local. A short time after we arrived we were told that about the best thing we could do would be to leave. Several people flourished guns and knives in our direction, and in fact, the situation didn't look wholesome. Among those who told us we had better get out was one man who had been insistent that we come. He said that he thought I was a preacher and didn't know until my actual arrival that I was a union organizer, so we left."

"They evidently don't want a branch of the textile union at Great Falls," opines Callahan.

Callahan is evidently right about it.

The Combustion Engineering Corporation, New York City, announce the recent opening of two branch offices, one of which is located at 216 Latta Arcade, Charlote, N. C. This will be in charge of T. E. Nott. The other new office is at Seattle, Washington, where the company is represented by Fryer-Baker Co. This company also maintains a district office for the southern trade at Atlanta, in the Candler Building, in charge of A. A. Hutchison.

The New England Mill Situation.

After an active trade in the first two months of the fall, cotton manufacturers are again back in a dull period so far as new business is concerned. They are apprehensive of lower prices despite the many cost factors that should tend to lift values in selling markets. There are many mills, especially those engaged on ginghams, that have ample business in hand. The print cloth mills have not been free sellers ahead at any time. The wide sheeting mills are still very busy and looms on pillow tubings are well engaged. As a rule, orders begin to run out next month on a number of staples.

In some places curtailment of production again is being talked of as a probability for the reason that the profit margin is narrowing and it has not been helped a great deal by the drop in raw cotton. The experience of manufacturers has been that when they try to buy actual cotton at the prices quoted in the exchanges they are mulcted premiums running as high as 1,000 points on, and even then they are unable to buy in normal quantities. One cloth manufacturer who wanted 1 1/16 staple and bid 23 cents a pound when spot cotton in New York was at 17.10 cents could only secure lots ranging from 50 to 100 bales. This condition is due largely to the holding power of those who have the good grades in hand and the probability that good spinning grades from this crop will command a premium for the balance of the crop year.

Aside from the difficult cotton situation, it is the fact that all merchants representing mills have been telling of the difficulties they find in selling cotton goods at advanced prices that are fully warranted by the higher cost of raw material. Even in the South, higher cloth prices are not welcomed, while higher cotton prices prevail. The true explanation is that a small crop does not mean widespread buying power for the farmer.

It was decided some time ago not to attempt a further wage reduction in New England mills on December 1 when the usual semi-annual wage period expires. It was contended by selling agents and by manufacturers as well, that any gain in reduced costs that might come from reduced wages at this time of high cotton and light demand for merchandise would result in a dissipation of the savings in cost among the mercantile rather than the manufacturing circles. In other words, it was said that if New England reduced wages, it would simply mean that buyers would hold off until the percentage of reduction was more than represented in a lower price for cloths.

Another factor, less vital from the manufacturing standpoint, was the slight reduction in living costs for the average mill operative in New England. Coal is still very high, and because of the sustained high freight rates, all food stuffs are relatively higher than in normal times. Rents have been greatly advanced in consequence of the very substantial increase in municipal and other taxes. As an argument against reductions at this time it was pointed out by some manufacturers that in garment and clothing manufacturing circles, workers were getting from $40 to $80 a week while more skilled workers in fabric mills were receiving from $18 to $25 a week maximum.

In other words, it is felt by all textile manufacturers in New England, and these include wool, silk, and cotton, that it would be grossly unfair to ask operatives to accept still lower wages while consumers, because of high garment making costs due to unliquidated labor, were still asked to pay unreasonably high prices for the made-up goods. Liquidation in garment making circles has already started by the promulgation of orders from garment manufacturers that piece work instead of day work will be restored in their factories. A strike has resulted but ultimately, economic conditions will force the liquidation that will tend to equalize textile labor and wages.

The long strain of limited orders and and close prices has finally become reflected in the dividends paid by the mills. For the fourth fiscal quarter of the year, Fall River mills capitalized at $38,710,000 paid out $673,075 in dividends to stockholders, or an average of 1.738 per cent. This was the lowest average paid since 1916. In the second quarter of that year the same mills averaged 1.408 per cent. Four corporations passed dividends. The Hargraves and Parker Mills debacle at Fall River, early in the year, is now taking form in a complete reorganization by directors in a concern to be known as the Parker Mills and to operate 230,000 spindles.

In New Bedford, a contraction of dividends has been taking place steadily and most of the mills centered financially in Boston, have also been getting back to pre-war rates of distribution. In Rhode Island the mills have been showing even less satisfactory conditions than in some other sections. The point made is that readjustment after war has finally reached to mill owners and that too in spite of very large reserves accumulated in the war period.

The most serious problem to many New England cotton manufacturers at the present time is the great burden of taxation. At some recent mill meetings it was shown that the mill taxes amounted to more than 40 per cent of the capital. The menace of heavy municipal taxes is even graver than the excess profits tax of the government. It is manifest that there can be no excess profit paid if there are no excess profits and there are not likely to be any of moment in New England this year for next year's payments. On the other hand, some mills at Fall River have been taxed as high as 7 per cent of their capital stock by the city in which they are located. Lawsuits are promised but at best hardly two-sevenths of this immense taxation can be relieved in the immediate future.

The most gratifying feature of the New England situation is a return of efficiency in many manufacturing plants, and especially so where it has been possible to get the plants running in full. Labor troubles have been negligible and there is a strong desire on the part of workers to stick to their jobs and make what they can while they last. A surplus of labor is not probable, but in that respect the conditions are so much better than they were that many mills are able to secure a lower production cost than at any time since 1914, in so far as labor efficiency can be tested.

In the case of some large units of production such as the Amoskeag Manufacturing Company of New Hampshire, and the American Printing Company at Fall River, where operations in full were brought about by securing business on cloths at very low prices, the improvement in the character and volume of work done by operatives was sufficient to save mills from making losses that were fully expected when the drastic price reductions on cloths were made last spring. The desire to maintain full operations

for the purpose of keeping costs low is one of the factors that will have constant influence upon market prices. The time of bloated profit margins has gone by for some months, manufacturers think.

The fine goods industry is still not fully employed although it is running better now than at any time this year. There has been less price cutting in fine goods than in other lines, except ginghams, and it has been possible to accept orders for many fancies that have not been made in a large way for some years because of labor conditions. But in the absence of a good demand from the automobile trade many fine yarn mills are running light. The tire fabric business is improving slowly as a consequence of liquidation in tire prices forcing more sales. There has also been a substantial liquidation of stocks of goods held for the account of tire making companies by many of the mills.

It is not expected in this section that the automobile industry will ever again become the source of such wildcat speculation in cloths and yarns as that seen two years ago. There will continue to be a large consumption of these goods. Combed yarns are not expected to figure as largely in many of the tire products as many of the better qualities of carded stock. At the same time, it has been demonstrated to the banks and to other agencies, that the automobile industry will buy hereafter in mercantile quantities on a mercantile basis and to that extent it will aid in getting these new products on a safer basis for future investment.

Finishing plants are still doing very well. Recent reports showed that most of the New England plants were as busy as at any time this year. The large printers are especially busy. Some of the bleachers have been curtailing very much in the past month. The job printers have not done as well as the large corporation printers but they now have more work than they had two months ago. The dyers are moderately busy but their trade is spotty. Owing to the sustained labor costs in related industries the finishers have not been able to cut their costs as fast as converters have desired.

More business has been coming into sight slowly in machinery circles. The plants are not running in full but some of them have been making more headway than at any time this year. The belief grows that with lower steel and general building costs, new mill additions will become more general here and in other sections.

It would be untrue to say that New England is pessimistic or optimistic about the long future of cotton manufacturing, but neither can it be said that very definite plans are likely to be developed for vigorous retrenchment. At the moment, conservatism of the typical New England type is rampant, and that usually means that close profits are expected.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, November 19th, 1921.

The value of cotton worked into new low ground for the downward movement during the past month owing to no improvement in the spot demand and the disposition to raise crop estimates as the result of the continuance of favorable weather in the interior and larger ginnings to November 1st than generally expected, 6,646,000, which is already more than the government forecasted for the season, which was 6,537,000 bales.

The larger ginnings have been followed by a crop estimate by A. Norden & Co., New York, for a production of 8,000,000 bales, and it is now generally believed that the yield will likely be between 7,500,000 to 8,000,000 bales. However, the further sharp decline in values has about discounted this feature of the situation, especially since returns indicate an increase in consumption, which alters the situation very little from a prospective demand and supply point of view.

According to the Census Bureau, mills of the United States during October consumed 556,000 bales including linters vs. only 450,000 for the corresponding month last year, making the total since August 1st 1,815,000 against 1,489,000 last season.

Foreign spinners are taking liberally of American cotton also, the total since August 1st amounting to 2,161,000 vs. 1,337,000 one year ago, of which Japan and China are credited with 418,000 against only 9,000 to even date last year; total takings by the world thus far this season amounting to 4,415,000 bales compared with only 2,809,000 last year.

That consumption in America, and probably in the Orient and Europe, is to continue large, is denoted by the number of active spindles in operation in America at the close of October—34,255,000 vs. 33,898,000 at the end of September this year and 33,771,000 at the close of October one year ago.

In view of the fact that present prospects point to the probability of the world consuming about 13,000,000 bales this season, of which 6,500,000 is allowed America and 6,500,000 the rest of the world, there is the likelihood of something akin to a famine being experienced next summer, not only in American but in East Indian and Egyptian as well.

In 1920 the world production of cotton was estimated at 19,830,000 bales exclusive of linters, and consumption was placed at 18,451,000 bales. This year the American crop promises to be more than 5,000,000 bales less than last year's 13,271,000, and the Egyptian crop is officially estimated at only 654,000 bales vs. 1,251,000 last year, while the crop of India in 1920 was only 2,976,000 against 5,845,000 in 1919.

As to prospects for the next crop, the outlook is not at all encouraging, if not serious, since the wide-spread destruction of the weevil and inability of farmers to obtain sufficient funds to plant a large acreage was responsible for the small crop this year.

There is no doubt that the world will be virtually drained of its surplus cotton before another crop finds its way to the market, and as the trade will likely need a large, perhaps a very large crop for the season of 1922-23, of which there is no assurance of making, what would happen if only a moderate yield of about 12,000,000 bales was the result, whereas there is the possibility of another short crop?

These are the conditions and possibilities, if not probabilities, that spinners have to reckon with, and it looks as if it would be the part of wisdom for American mills to contract ahead for their future requirements.

Germany and Japan, while England appears to lie dormant, are taking larger of the American product.

Spinners Meet for Discussion at Gastonia.

(*Continued from page* 100.)

from time to time, but at present I am running filling wind on the warp. However, it was not until the Saco-Lowell people brought out a new kind of spooler that it was successful. This spooler has a traverse coming up and down with the bobbins. Since we have been running it this way we get about six more turns on the front roll. The only reason I haven't gotten the whole mill on it is because we have not enough of the new type of spoolers. I believe that we get a better yarn, more uniform, and one that breaks a little stronger, simply because there is not such a variation in the tension."

The next man to be heard from was Mr. Poovey. "My experience is possibly a little different," he began. "I have a seven-inch stroke traverse with no separators, and we can use filling wind to better advantage than the warp motion. I think it depends on the stroke of the traverse, but on spooling I have never seen anything satisfactory on all numbers of yarn. I once ran some experiments at a mill on 26s yarn. We had about 15 or 20 of the different makes of tension devices. We used the ball method, but when the end would break down the ball would keep on running until it would pull the yarn all the way through. About the best thing I have been able to find is the tension device used by the Foster people on their winders."

Mr. Winget was the next speaker. "In regard to spooling from the filling wind, we have 20,000 spindles and 10,000 twister spindles and use the filling wind altogether. We use doublers for the single yarns, and on fine numbers this is very satisfactory. The cost is naturally more than spooling—a hand can spool twice as much as she can double. On the two-ply yarns we had four spoolers fitted with the ball tension device, but it was very unsatisfactory. We finally discarded it and put in the Foster tension device. In this there is a traverse that the bobbin sits on that comes up and down with the bobbin. We get splendid spooling."

Mr. Winget was followed by Mr. Phillips, who said they have 107,000 spindles on filling wind, and continued, "When we put in this filling wind we got rid of our separators, and we find that we get better yarn, more uniform, with a better breaking strength, and we don't have the unnecessary ballooning of yarn that you get with the warp wind frames. I think it makes the yarn better and it does put more on the bobbin. I can get a little more speed."

"In regard to spooling filling wind," continued Mr. Phillips, "I too have had some trouble. It has been very unsatisfactory spooling this filling wind stuff. However, I know a man who has a guide that will spool it to your satisfaction. It can be applied to any spooler. It has different weight tensions that will spool any numbers of yarn. I have seen it tested on numbers from 8s to 70s. It has little fiber washers for the different numbers of yarn, and it will eliminate trouble with this filling wind spooling. It is made on the order of the Saco-Lowell guide." Mr. Phillips stated that the man who has this tension is overseer of spooling at the Loray Mills, at Gastonia.

To determine the general opinion in regard to this process, Mr. Dilling asked "Would anyone change from the filling wind back to the warp wind?" Not a reply in the affirmative was received, which caused Mr. Dilling to add, "Of course it costs more, but it is better in the spinning room."

Mr. Wilson said at Winnsboro they have all the old mill and half the new mill on filling wind, but that they are having some trouble with the tension in spooling.

This subject was left here, and Mr. Harris put the following problem before the meeting:

"A certain man is running 43s filling with single roving, 5.56 hank, with a draft of 8, and he wants to know is there anyone else who is doing that or running anywhere near this number who can give him some advice. He is running 1 1/16-inch cotton."

At this point Mr. Clark made a statement in favor of single roving. He declared that much of the success of the English spinners is due to the fact that they generally use single roving, and also that they age their cotton and let it stand three days to a week before using, and then put it through opening machines, the Creighton opener, etc.

He then stated that two mills in which he is interested have a difference in the cost of yarn—one has a cost of 4.13 cents and the other a cost of 6 cents—and this is attributed in a large measure to the fact that the mill with the smaller poundage cost uses single roving. Also, he said, this mill uses a C. O. B. machine, without the doffer, two processes of lapping, 25 cards, one process of drawing, one of slubbers and one process of speeders. He declared that the two mills offer a good comparison inasmuch as they both are on about the same numbers, and have approximately the same lines of equipment; the other mill contains 22 cards.

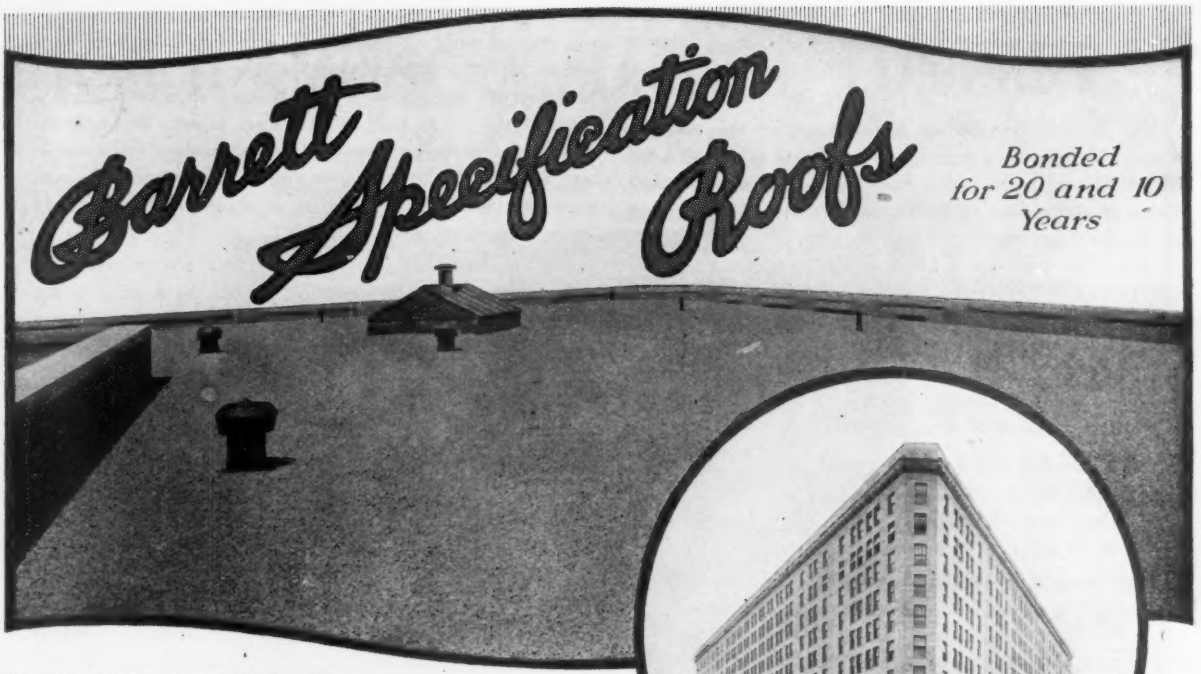
Mr. Covington said he was once called upon to make up some samples of cotton flannels. "They wanted an improvement in the finish of the goods," he said, "and I tried a good many drafts and a good many hank rovings. Finally, I decided on 9s filling, single roving, 8.33 draft, and got excellent results."

Spinners were able to run from 16 to 18 sides in a mill he once had, with 45,000 spindles making 21s to 32s, by the use of single roving, declared Mr. McFalls. "The drafts were short all the way through the carding and the spinning draft ran around 8." He was using three processes of picking, he added.

Mr. Covington laid some of the uneven work made today at the door of the revolving flat card and the resultant heavy carding. "The first mill I ever had," he went on, "had the old wooden top flat cards, and I ran a 38 grain sliver on 20s yarn, and got about the best yarn I ever made. I believe the trouble with us is that we have gone to the revolving flat card and we have gotten away from carding very light. Why, take on 20s, where I made a 38 grain sliver, a whole lot of us make a 68 or an 84. If we would get back to the old way of carding light, I believe we would make just as good yarn as anybody."

Taking the discussion back to the spoolers, the chairman asked the question, "Which lets the most gouts through, the plain spooler or the saw-tooth guide?"

"In my mind there is no question about getting better results with the saw-tooth guide," was the reply of P. A. Smith, of Columbia. "I mean the one with the little comb that fits down in the top of the guide. It will break more ends, but that it just what you want it to do. We made a number of tests. We counted the slugs that would come through in a wrap on the beam, and on a 2,500-yard wrap,



Barrett Specification Bonded Roof on Arlington Building, Washington, D. C. General Contractors: Underpinning & Foundation Co., New York, N. Y. Roofer: Warren Ehret Company, Washington, D. C.

A No-Risk Roof on the War Risk Bureau—

Architects: Wyatt & Nolting, Baltimore, Md.

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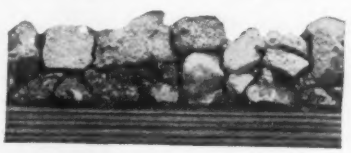

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The Barrett Company

THE BARRETTT COMPANY, Limited: Montreal, Toronto, Winnipeg

there were twenty-five to thirty per cent less gouts came through on the saw-tooth guide than on the other. It was a good investment because it took the slugs out of the cloth."

Mr. Poovey brought up the question of the weaver's knot. "My idea of a high class yarn is to tie it with the weaver's knot." He added that he thought the weaver's knot a good thing on all yarns, particularly on those yarns for the knitting trade. "We know," he said, "the knitters are gradually going to a finer needle—that means a finer knot for us."

Mr. Winget was the next speaker. He raised the question of the advisability of using the weaver's knot when a man's production is limited on the spoolers, asking if it does not take more time to handle the work by tying the weaver's knot.

"If I had that case I would keep the old spooler guides on," declared Mr. Poovey. He brought out the point that if the help are once educated into tying the weaver's knot it will work all right.

In discussing the point he had previously brought up, that of the weaver's knot requiring more spooling equipment, Mr. Winget said that if the men who built the mills that were constructed 20 and 30 years ago had studied the proposition, and made allowances for the additional floor space required, the weaver's knot could be more universally adopted. However, he explained, the walls of our mills are not conveniently removable, they are as they are and we must make our practices to fit in with the conditions now existing.

Another man who is using the weaver's knot was B. H. Wilson, of Winnsboro, who is using it on ply yarn.

In regard to the question of whether more hands are necessary when the weaver's knot is used, this statement was made by W. L. Smith:

"We make 48s two-ply and we run it on the doubler and take the tubes to the warping machines, and it takes four hands tying the weaver's knot to keep 100 spindles running. Sometimes we put our best hands on it and three of them can keep 100 spindles going. But most of the time it keeps four hands busy."

Mr. Williams, of Winnsboro, told Mr. Smith—who indicated that he had been using the weaver's knot for only about a month—that after a few months experience two hands should be able to handle 100 spindles.

Mr. Richie was another user of the weaver's knot. "When I went on the weaver's knot, it took about four hands to run 100 spindles, but at the present time one hand can keep 50 spindles running; however, it took them a good while to get onto it.

"There is this disadvantage on the spooler—they have to hold the spooler while they are tying the weaver's knot," continued Mr. Richie.

Mr. Richie also said that after the hands get used to it they like to tie the weaver's knot, though it does tire them more around the shoulders.

Chairman Harris at this point made an appeal to the mill men present to cooperate with him and the other chairmen of the association toward the eradication of the evils that exist in the mills today which cause the uneven yarn and cloth about which they had been so earnestly discussing all day.

"I would like to have every man here make a test and size every bobbin off the side of a frame, as has been suggested, and report his findings at the next meeting," said Mr. Harris. "And I would like to have all of you compile a list of the things that he knows are causing this unevenness in the spinning rooms. A lot of carders will concede that a whole lot of this unevenness comes from the card room, but we have a whole lot of things in the spinning rooms that cause it.

"If we can establish the things that are the cause of this trouble, and eliminate them, it will be a great thing not only for us but for the industry as a whole. I hope you will make these tests for us and either send them in to me or report them at the next meeting. I will appreciate it and thank you."

Following this request, Chairman Harris proceeded to bring the meeting to a close, but—

"I wish you wouldn't stop here," interrupted Mr. Smith, of Columbia. "I came all the way over here to ask a question."

"Go to it," urged Mr. Harris.

Mr. Smith then proceeded: "We are confronted with the question of running a higher humidity than 60 per cent of moisture. Is anyone running spinning on 30s and 40s with as high as 65 per cent of moisture?"

Mr. Wofford, of Spartanburg, said he gets the best result at about 65 per cent.

After some further discussion on this, the practical discussion was brought to an end, and Mr. Dilling announced that all the mill men who desired to visit the plant of the Cocker Machine & Foundry Company in Gastonia would be welcomed at that plant. After the meeting had adjourned, a number of the visitors availed themselves of the opportunity of inspecting these works, others going to several of the famous yarn mills in and around Gastonia.

Gastonia is a good town; its people are fine people—this was the unanimous opinion of the visitors after they had enjoyed the hospitality of the "fine yarn center of the South" for a day. "We were wonderfully provided for, and I hope we will have another meeting in Gastonia soon," was the remark of one visitor. He spoke for the crowd.

A Time and Labor Saver.

The accompanying photograph illustrates how the progressive manufacturer is meeting the output and cost of labor problem in so far as the cutting-room is concerned. The operator of the laying machine is just completing a lay of 480 plies of nainsook, the pile being 6 inches high, and this will soon be ploughed out into parts of union-suits, as seen on the adjoining tables. Considering the laborious task it is to make these long spreads of soft finished cloth by hand, it is a revelation and relief to watch the ease and speed of this "laying-up machine," operated by one person. He piles on the machine a load of ten pieces or so of the cloth and merely walks with it, forth and back, laying while moving in both directions. At either end of the lay are catching-weights set to position, on which the carriage operates, automatically folding back the cloth. The various cutting tables seen are tracked alike, so that after a lay is finished the machine is removed to another table by means of a platform on casters.

H & B AMERICAN MACHINE COMPANY

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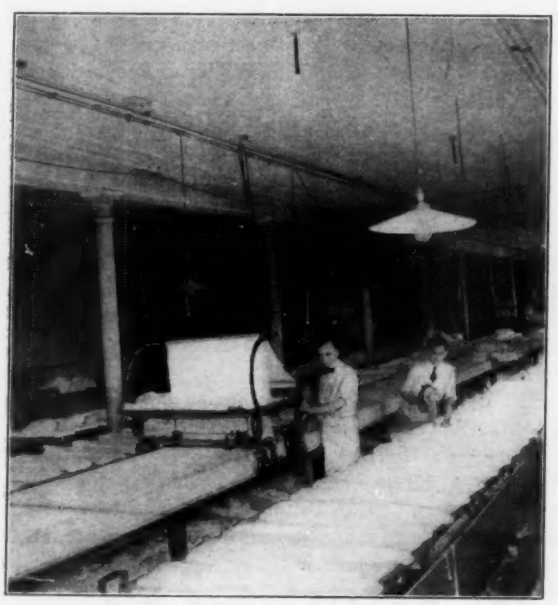
COTTON MACHINERY



These machines are equipped with Hyatt roller bearings to enable one operator to use a machine all day without fatigue and at greater speed. They are manufactured by The Shuttle Machine Company of New York City. H. I. Frankel, engineer, Borgenicht & Sons Company, is responsible for the application of Hyatt bearings to these machines as he specified that the eight 'Shuttle' Machines used by Borgenicht & Sons Company be Hyatt equipped. The results were so satisfactory that all machines made by the Shuttle Machine Company in the future will be equipped with these roller bearings.

By actual clocking of the work before and after having Hyatt bearings installed, Mr. Frankel determined that the bearings speed up the work from 10 to 12 per cent. Wheels with Hyatt bearings in them can be obtained from The Shuttle Machine Company and applied to laying-up machines of their make now in operation and will give the above increase in efficiency.

An announcement of interest to all cotton dyers is made by the National Aniline & Chemical Co., Inc., in the introduction of a new sulphur blue yielding indigo shades. This new dye is known as National Sulfindone Blue B Conc. It produces brilliant indigo-blue tones, and because of its high concentration, excellent solubility and levelling properties, it will no doubt prove of unusual value for raw stock, yarn or piece dyeing.

"Steam Turbine and Alternator Units" is the title of a new bulletin No. 1119 which has just been issued by the Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin. This bulletin, which is finely illustrated, contains nearly sixty pages of matter covering high pressure condensing units of 1500 and 1800 revolutions per minute. Inasmuch as turbines of these types are much in use in textile mills, the descriptive matter and illustrations will prove of much interest to all manufacturers who are in a position to generate power for their mills on their own property or adjacent thereto. A copy of the bulletin may be secured by interested mill men on request.

Notes About Men You Know.

A. CULBERSON, formerly connected with the Dixie Cotton Mills, LaGrange, Ga., and for the past two years Greenville representative of the Hunter Manufacturing & Commission Company, has been appointed manager of the Camperdown Mills, Greenville, S. C., the Enoree (S. C.) Mills, and the Alice Mills, at Easley, S. C.

W. W. MOORE has resigned as superintendent of the Riverside Division of the Riverside and Dan River Cotton Mills, Danville, Va., on account of ill health.

E. H. ROGERS has been made superintendent of all carding and spinning at the Riverside Division of the Riverside and Dan River Cotton Mills, Danville, Va., following the resignation of Mr. Moore as superintendent; L. J. Southworth has been put in charge of all weaving and finishing at the Riverside Division as superintendent; C. E. Clark has been made superintendent of all carding and spinning at the Dan River Division; and C. C. Boland is superintendent of all weaving and finishing in the Dan River Division. All these men are under the direction of George W. Robertson, who is general superintendent of both divisions. Mr. Robertson was formerly superintendent of the Dan River Division.

H. G. LEIGH has resigned as superintendent of the Margrace and Patricia Mills, Kings Mountain, N. C., to accept a position with the Fidelity Manufacturing Company, Charlotte, N. C.

J. H. COOKSON has resigned as assistant superintendent of the Cabarrus Cotton Mills, Kannapolis, N. C., to become superintendent of the Lorraine Manufacturing Co., Pawtucket, R. I.

O. L. DERRICK has accepted the position of overseer of No. 2 spinning at the Fulton Bag & Cotton Mills, Atlanta, Ga.

W. T. BYRD, formerly overseer of carding at the Dacotah Mills, Lexington, N. C., now has a similar position at the Erwin Cotton Mills No. 1, West Durham, N. C.

L. N. CHANDLER, formerly superintendent of spinning at the Camperdown Mills, Greenville, S. C., has accepted a similar position with the Mills Mill, of Greenville.

M. L. BURTON has resigned as superintendent of spinning and twisting at the Spartanburg County Mills, Spartanburg, S. C.

D. C. JONES has resigned as weaving superintendent at the Laurens (S. C.) Mills to accept the position of superintendent of the Drayton Mills, Spartanburg, S. C.

W. R. THOMPSON, who for some years has been connected with the Miller Cotton Mills, Waco, Texas, as night superintendent, has gone to Natchez, Miss., as overseer of weaving at the No. 1 Mill of the Natchez Cotton Mill Co.

W. S. FORBES, of Richmond, Va., president of the Henrietta Mills, with plants at Henrietta and Caroleen, N. C., has resigned that position, and is succeeded by S. B. Tanner, who formerly held the position of president of these mills, having retired several years ago.

E. H. MILLER has become overseer of spinning at the Jewell Cotton Mills, Thomasville, N. C. He was formerly carder and spinner at the Vance Cotton Mills, Salisbury, N. C.

J. E. COPLIN has accepted the position of overseer of dyeing at the Deep River Mills, Randleman, N. C.

NEWTON E. SMITH, superintendent of the Easley (S. C.) Cotton Mills, and associated with the plant for the last fifteen years, died recently following an illness of several weeks. He was well known among southern textile men, through his long connection at Easley.

W. J. MCDONALD, 58 years of age, who has been connected with the southern textile industry for a number of years, died recently in Pelham, Ga.

C. A. SPARKS has accepted the position of overseer of carding and spinning at the Kings Mountain (N. C.) Manufacturing Co.

J. E. HAND, formerly carder and spinner at the plant of G. H. Tilton & Sons, Savannah, Ga., has become overseer of carding at the Lavonia (Ga.) Cotton Manufacturing Co.

L. W. KING has become carder at the Hamilton Carhartt Mills at Rock Hill, S. C.

J. C. ELLER is overseer of spinning at the Monroe (Ga.) Cotton Mills.

J. B. WALKER has been made overseer of weaving at the Glen Raven (N. C.) Mills.

H. F. MOODY has resigned as superintendent of the Drayton Mills, at Spartanburg, S. C., after six years service.

HENRY D. MARTIN, of Warren, R. I., a well known mill man of New England, and an occasional contributor to COTTON was a recent visitor at the Editorial Rooms. Mr. Martin was on a brief trip through the southern section.

J. T. WARDLAW, manager of the Atlanta office of Lockwood, Greene & Company, arrived at the office on the morning after Thanksgiving Day with a happy smile and the announcement of the arrival at his home on Thanksgiving Day of a bright, bouncing engineer of the future, James T. Wardlaw, Jr.

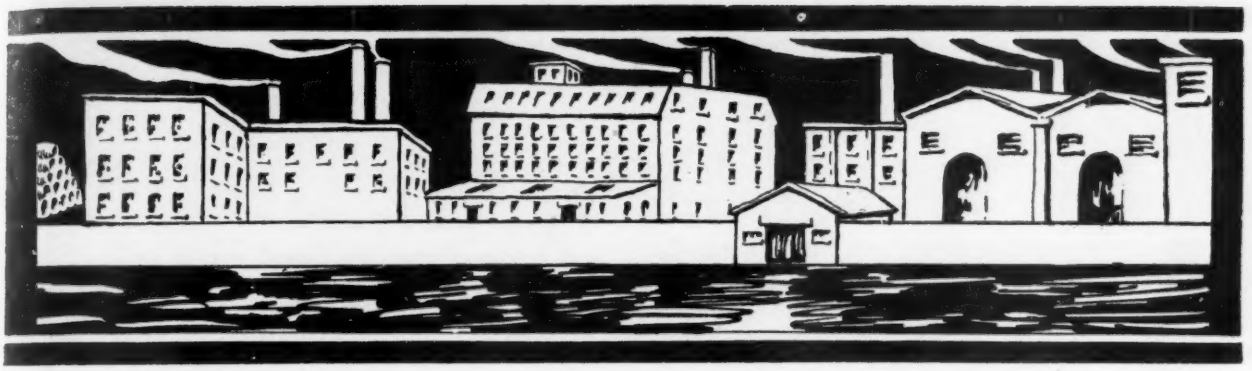
J. M. CANNON succeeds the late N. E. Smith as superintendent of the Easley (S. C.) Mills No. 1. Mr. Cannon was formerly superintendent of the Simpsonville (S. C.) Plant of the Woodside Cotton Mills Co.

A. P. RUSH has resigned as spinning overseer at the Ninety-Six (S. C.) mills to accept a similar position with the Panola Mills, Greenwood, S. C.

LEONARD W. KEARNS has become affiliated with the sales organization of the Chicago Belting Company. He has been active in the leather belting business for twenty-two years, eighteen of which have been in the service of one company. His experience in selling belting has carried him throughout the United States and Cuba. He is well known among the trade, and is a practical belting engineer.

J. M. JACKSON is the manager of the Florida Knitting Mills, Ocala, Florida, which were recently organized from the Ocala Knitting & Manufacturing Co.

M. E. WENTZELL will be general manager of the branch of the Interwoven Mills, Inc., at Harper's Ferry, W. Virginia, when this is completed. The plant will manufacture hosiery.



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STRAIGHT LINE METHODS

A Nation's Appeal for Facts and Figures

EXPERTS of the Economic Advisory Committee, Manufacturers Division, of the National Conference on Unemployment find that:—

"One of the chief causes of the present industrial depression is the business man's lack of dependable information —essential Facts and Figures bearing on his own general line." Compelled to rely on pure guess work, or arbitrary estimates, business stumbles and progress halts.

Also that Stabilization, and the avoidance of recurring industrial depressions, depend, in no small measure, on an accurate and complete knowledge of the factors affecting the business situation.

This is a nation's appeal for adequate Facts and Figures.

It is a call for a wider and more expert application of *cost accounting principles* in all lines of commercial endeavor.

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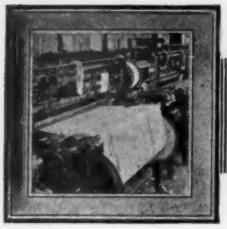
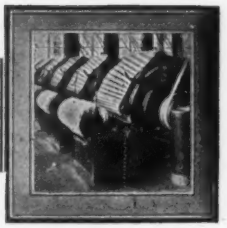
STRAIGHT LINE METHODS



How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects



Some Questions on Carding.

EDITOR COTTON:

I would like to have the following questions in regard to card speeds answered:

What is the best speed for a card cylinder to get the best results? If a cylinder is run over 175 r.p.m., does it injure the fibers of cotton? Is it better to run a cylinder at 175 r.p.m. and card 125 pounds to the card, or to run them at 155 r.p.m. and put through the same amount of production?

Which will produce the best quality and the strongest yarns, the cotton that is carded with a 175 r.p.m. cylinder speed or at 155 r.p.m.?

What is the fastest speed a cylinder can travel without injuring the clothing by centrifugal force from the face of the cylinder, the clothing being drawn on at a pressure of 325 pounds. Will the clothing last as long and can the card be set as close with a cylinder speed of 175 r.p.m. as at 155 r.p.m.?

If the carding was limited and no additional space was available to put in extra cards to card slower, would it pay to go up on the cylinder speed from 155 to 175 r.p.m. and get more beats per inch at the feed plate and produce the same amount of production as at first?

We know that the shops give a speed of 165 r.p.m. as the limit that a cylinder will stand. Is it on account of the clothing or injury to fibers?

I shall be glad to see some discussion on these questions by other readers. J. F. L. (Ala.)

Card Backs and the Licker-in.

EDITOR COTTON:

With much interest I read in the September number of COTTON the discussion held by the carders' section of the Southern Textile Association at Columbia, S. C., on licker-in speeds, etc. In some instances the opinion seemed to be that a higher licker-in speed gives off more fly, and a lower yarn break, as compared with the opposite for a slower speed.

For the benefit of those who have experimented along these lines, I wish to state that I have seen and worked on cards where the opposite proved to give less waste, at the same time giving an over-standard break. Here I want to draw into the discussion the statement made by "Wash. (Conn.)" in the same number, that the card clothing does the work, and that the different makes are of minor importance. I agree that the correct wire must be used, for the various grades and staples, etc., but if the licker-in, mote knives and feed plate are not correctly used, it will spoil the carding, regardless of the clothing.

Coming back to the licker-in, I am going to illustrate

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

where a back setting, combined with a fast licker-in speed, gave a clean back, only motes and seed being visible under the licker-in. This was accomplished by a grinder who had been with this particular mill for 35 years. A new superintendent and overseer came to this mill eight years ago and both complained of the amount of fly and lint under the licker-in. So the grinder, by experimenting, found a setting for his backs that, with a licker-in speed of 565 r.p.m., produced a perfectly clean back, free from anything but motes and seed.

This mill has been running its cards this way ever since that time, and is quite proud of its achievement. Most every outside mill man, upon being shown this feature, generally remarks that he has never seen anything like it.

I learned grinding under this grinder's tutelage, and consequently knew the way to set this make of cards to obtain the same results. I left this mill a short time afterward, but returned after two years' absence to help equip and start up a new card room. I had been a grinder and roadman on this new make of cards they were installing. Although these cards were of a different make from their old ones, the same make and number of wire was used on the clothing.

After getting started up in good shape, the old grinder whom I have previously mentioned, came down, accompanied by the overseer, to look at the backs. "Why," they said "there is too much fly and lint under them." I told them that this make of card could not be set to do the work they were expecting. The licker-in was making 400 r.p.m. as compared with the 565 r.p.m. speed on the others. I told the old grinder to see if he could get them but try as he would he couldn't obtain a clean back.

What the old grinder had accomplished on the backs of one make of cards, he couldn't on the backs of another. Also, the fast speeded licker-in gave no waste, except motes and seed under the back. While the slower licker-in gave a fairly good percentage.

But in regard to less waste making a stronger yarn, the opposite occurred in this instance. I made a test from the two different makes of cards, and upon breaking the yarn, which was 23s, I found that the average break per

bobbin was 2½ pounds better for the new cards than for the old. The boss spinner informed me that he had been getting better results from the roving made from these new cards.

A clean back looks good, but the percentage of fly and waste is too small. What should have come out at the back goes into the work, causing a weaker yarn. The settings on the old cards could have been set to take out fly and waste, but on the new ones, no matter how they were set, or the speeds changed, it was impossible to obtain a perfectly clean back.

Thus it is evident that in the different makes, there is a difference in being able to set them, to get, or not to get, just what is most needed for bettering the carding on the same grade and staple. K. (Ohio)

Picker Beater and Fan Speeds.

EDITOR COTTON:

There is quite a lot of discussion going on at the present time as to the advisability of lowering the beater speeds from their previous high levels, the fear being expressed that to lower them would cause the yarn to be cleaned insufficiently, while to keep them at high speed would result in a lowering of the breaking strength.

To sum up this situation as it should be summed up, it will be necessary to keep in mind for what particular purpose the yarn is intended. If it is to be used for some kinds of cloth it is not strictly essential that it be entirely free from leaf, but if intended for other kinds of cloth, or hosiery and underwear purposes, it is very essential that it be very clean and free from leaf. In any event, and especially for high sley cloths, it is desirable that the yarn have as high a tensile strength as possible.

During the discussion on this subject at the sectional meeting of carders and spinners of the Southern Textile Association at Columbia, S. C., on Friday, August 19, some very interesting statements were made, these being especially interesting at this time as so much interest is being shown in this matter. In the first place, it might be well to examine the evidence, and see why the excessive speed of the beater injures the fiber,—and I believe we are all willing to concede that it does. The main reason is found in the kind of cotton being used. For instance, it is a big mistake to even attempt to run the beaters as fast on long staple cotton as they are run on short staple cotton. Why? Because the ordinary breaking strength of an individual fiber is greater on short staple stock than on long staple stock, this being best understood when it is stated that the short staple fiber has a diameter of approximately .0007 of an inch while the long staple fiber grades down as low as .0003 of an inch in diameter.

In using short staple cotton it is generally used for the coarser numbers of yarn, necessitating a heavy lap in which a heavy fringe of cotton is presented to the beater blade, this in turn requiring a high beater speed. Again, the short staple stock may in general terms be classed as low grade dirty cotton, which feature will also require a high beater speed in order that it may be sufficiently cleaned.

Not so with the long staple stock, this being generally used for fine work where a light lap is required, which in turn presents a light fringe of cotton to the beater blade. Again, in direct contrast to the short staple cotton, we invariably find the long staple cotton a high grade clean cotton, which feature does not require a high beater speed to clean it, a low speed being sufficient.

I have shown conclusively that the long staple cottons are the weaker as to individual fibers. They are also cleaner. Therefore, it would be serving no good purpose to maintain a high beater speed when running this type of stock, and would only result in injury to the stock being run. This together with the fact that such a light fringe of lap is presented to the beater blade, emphasizes strongly the fact that under no conditions is a high beater speed justified. Therefore, the point to be determined is the correct speed at which the beaters should be run for the various types of cottons with their varying lengths of staples.

The number of processes through which the cotton passes has a far greater influence than most men realize on the speed at which the beater should be run. But it must be understood that it is far better for the cotton being worked to pass through three or even four processes of picking with the beaters revolving at the correct speed, than it is to put it through two processes with a much higher beater speed.

The statement made at the Columbia meeting by T. A. Hightower, superintendent of the Addison Mills, Edgefield, S. C., that on Oklahoma and Texas 1 1/16 inch Middling, he was running his breaker beater at 1,200 r.p.m., his intermediate (Kirschner) beater at 1,000 r.p.m., and his finisher at 900 r.p.m., could be improved in only one instance, in my opinion, and that is in the case of the breaker, which could be run at 1,000 r.p.m. and produce better results.

Mr. Hightower's statement as to keeping his feed at the same speed should hold true in all cases, regardless of his beater speeds. However, one statement of his I do not understand, and that is where he said he got rid of a certain amount of short staple cotton and invisible waste making the yarn better without increasing his breaking strength.

There is no doubt whatever that with two processes of picking, he would get a stronger breaking strength than when using three processes, but he would not get as clean a lap. As before stated, it will depend entirely on the kind of cotton being used, when deciding at what speed the beaters should be run, but of one thing there is not the slightest doubt, and that is that regardless of the kind of cotton being used and the number of processes through which it passes, there is no further room for beaters running 1,500, 1,400 or even 1,300 r.p.m.

It has been previously stated that the long staple cottons were used on fine work, but one exception must be made to this rule, and that is in the tire fabric mill, where the long staple stock is used to obtain the desired breaking strength. But when using this type of cotton, on account of its extreme cleanliness and the delicate nature of the individual fiber, the beater speeds are cut way down. In fact, I know of several mills on this class of work that are getting splendid results with two-bladed beaters running 900 r.p.m. and three-bladed beaters running 600 r.p.m.

J. E. Robinson, of the Wateree Mills, Camden, S. C., made what is to me a very interesting statement when he said that on 1 1/16-inch cotton they had gone as low as 750 r.p.m. on their beater speeds, but that they had found the best results were obtained at about 1,000 r.p.m. There

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is one fact which is often overlooked and that is that there is a maximum breaking strength that cannot be improved upon, no matter how low the speed of the beater may be cut down, unless the type of cotton being run is changed to a better quality. This, to my mind, explains why when he got below 1,000 r.p.m. his breaking strength remained at a standstill.

A statement made by J. E. Hand, of Savannah, Ga., saying that when the beater is slowed down the fan speed must remain the same as it was previous to the beater speed being changed, and also that if this is not done the work will not be as clean, is to my mind very misleading. The speeding up of the fan in ratio to the speed of the beater never did and never will make cleaner work. This is against all good judgment because when the beater speed is lowered, the surface velocity not being as great requires greater effort on the part of the fan to carry the cotton forward to the cage section. It will therefore be found that if anything, the speed of the fan must be increased as the speed of the beater is decreased, or the stock will not be distributed properly on the cages and poor selevages will follow. Great care must be taken, however, that the speed of the fan is not so great as to prevent the droppings from falling down through the grid bars. If Mr. Hand had made the statement that slowing down the fan would in some cases produce cleaner work, he would have been more in harmony with actual results as obtained.

It appears to me that the chairman, Marshall Dilling, has the correct viewpoint, when he makes the statement that the cotton should be beat just enough to clean it, and not enough to injure the fibers.

I am looking forward to the next discussion on this subject, as I think this is a very interesting question which will certainly be of benefit to all concerned.

Benjamin (Conn.)

Answers C. W.'s Double Carding Question.

EDITOR COTTON:

In reply to the inquiry of "C. W." relative to uneven numbers, I would say that it is difficult to put a finger on the spot where this trouble might be located.

As I understand it, he had no trouble keeping numbers when making an ordinary single carded yarn and the only change made in his organization was to add another process of carding with the changes of weights necessary on the pickers and breaker cards.

In the supplementary information furnished me, "C. W." speaks of making the laps for his finisher cards on a sliver lap machine. I presume he means a lap winder, or, as it is sometimes called, a derby doubler, as made by the Saco-Lowell Shops. But he is not exactly correct in saying this machine has no draft. There is a mechanical draft of about 1.15 and this, with the slight stretch which the laps undergo, gives an actual draft of about 1.20, so that with his 84 slivers of 70 grains each, the weight of his finisher card lap should be about 11¼ ounces.

While the lap winder seems to be a very simple machine, it can and will make uneven work provided it is not properly taken care of. The spoons should work freely and not hesitate. The lap made should be firm and solid and not be allowed to "belly," for this will cause undue stretch and make the work uneven.

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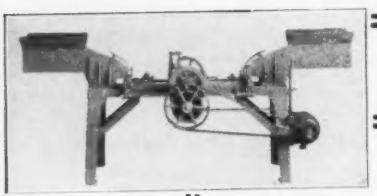


ITS LESSONS PROFITABLE

1921 is about finished.

But it hasn't been a bad Old Year at that. At times it has been a bit strenuous, but on the whole, it has dealt most bountifully with us all.

To be true, it has taught us many lessons—lessons that should be of value to us in judging the future—that, in some instances, have been difficult to learn, but of great value to us, nevertheless.

We have had a most successful year—more than we had anticipated—for which we are duly thankful, while our prospects for 1922 are most promising.

To Our Friends and Customers and the Textile Industry as a whole we extend our grateful appreciation, and Wish For Them, One and All, a Bright and Prosperous 1922.

THE TERRELL MACHINE CO., Inc.
Charlotte, N. C.

It is very evident that "C. W." is using care on his fly frames in making piecings, but he should be sure that the roving is not being stretched due to excessive tension.

If "C. W." has a fast and slow motion doffer speed he should make sure that the doffer is always thrown onto the fast speed after piecing up. The writer once had an experience with uneven numbers that was traced directly to this source, for while the doffer speed should not affect the draft theoretically, a decrease in doffer speed will make the sliver slightly heavier, in actual practice. This can easily be checked by weighing.

"C. W." has an organization of weights and drafts that I can find no reasonable excuse for criticizing, and I am of the opinion that his trouble may be found somewhere back of the drawing process. This seems reasonable since he had no trouble when using a single carding process. This fact would also incline me to be of the opinion that his trouble might be located in his second process of carding.

However, if I were in his place, I would try to locate the trouble by "process of elimination." I would go about this in the following manner:

Take a lap from the finisher picker and weigh individual yard lengths. These weights should not vary more than 2½ to 3 ounces on his class of work. Then examine the lap by unrolling before a window so that the holes, thick and thin places and any other irregularities can be seen. It may be possible that his eveners are not working properly, and in this connection I would like to call his attention to the article on page 878 of the October number of COTTON entitled, "The Mechanics and Practical Operation of the Perham and Davis Evener." In this manner he can eliminate the picking process as a source of unevenness.

Next, weigh slivers from the breaker card. These should not vary more than five grains either side of the standard. Then weigh very carefully the laps made on the lap winder in one-yard lengths. These should vary but very little, for with a normal sliver from the breaker cards, the large doublings on the lap winder should tend to make this lap very even. I figure that this lap should weigh 11¼ ounces, and it should hold very close to this weight.

Then weigh the finisher card sliver which should not vary more than three grains each side of the standard.

In this manner, "C. W." whould be able to locate his source of unevenness, and then take the measures necessary to correct it. S. A. F. (R. I.)

EDITOR COTTON:

After reading the questions of "C. W. (N. C.)" in October COTTON, I tried to draw up an organization which, I believe, will solve his troubles in regard to uneven yarn. I am outlining this organization in this letter; it is in practical use in a mill where I once worked, and is producing even yarn.

"C. W.'s" cotton should be mixed in as large quantities as possible and allowed to condition as long as possible in a room at a proper temperature and relative humidity, so that the effect of compression in baling may be nullified and an amount of moisture absorbed from the air. The relative humidity in this room should be kept nearly constant.

His cotton should be fed to the hopper, whether by hand or machine, in a systematic and regular manner, never allowing the supply to get too low or too heavy. Machine or automatic feeding is the most acceptable method, as it takes away the casual attendance to the work at hand. The apron on the hopper should be in good repair, having all spikes working. The excess feed doffer should be working properly and set so as to do its work right.

Carrying on to the finisher picker, he must take care that his laps do not split in the back. His operatives should be taught that they must keep laps on the apron and not let them run down from lack of attention. There is a limit to the work of the evener and one can hardly expect to get perfect results from a doubling of three where the belt has been set for a doubling of four. Laps fed in at the back should be so arranged that they should not all run out at once. The evener motion should be tested as to its sensitiveness to thick and thin spots in the lap. The belt should make its base in the center of the cone.

"C. W." does not mention whether or not he weighs all his laps. Once the lap leaves the picker, its only chance of losing its unevenness is through doubling and the resulting average. He must weigh each lap, allowing not over ½ pound variation either way on a 40-pound lap. Bad laps should be run over again and, if possible, the fault rectified. If his machines are of different makes he should go through their gearing and prove that his draft is equal on all of them. Weighing the laps will be a check to a certain extent. He should clean his evener motion levers to assure him that they work freely, for they often get stuck and lose the real value they have. In my estimation, his finished lap is too heavy and throws too heavy a draft on his cards. He should not run over a 12- ounce lap for best results. He should apply some patented lap-splitting preventer if he has not already done so.

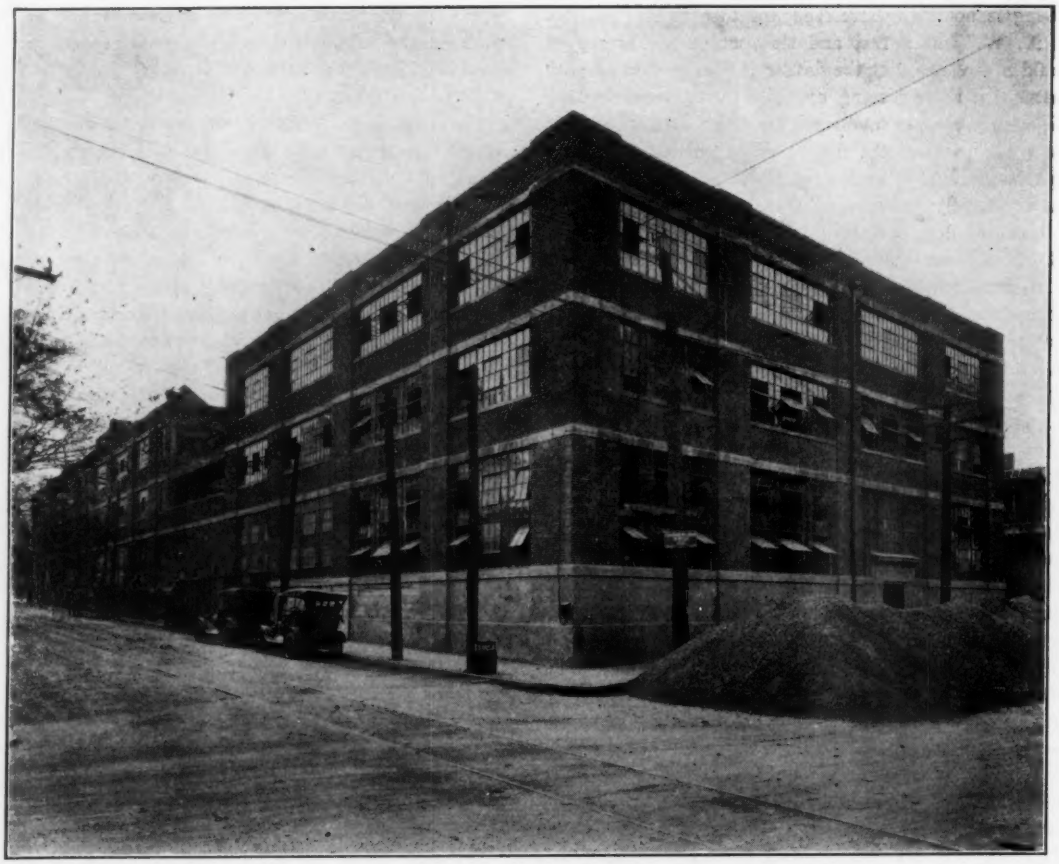
Coming to the cards, "C. W." should see that his laps are not splitting for here would start more uneven work. He should strip the cards regularly, at least twice a day, for when cards are not stripped often enough, dirty and uneven work is bound to result. His total draft of 127.6 is too high, and by using a 12-ounce lap and a draft of 105 in the first cards, he would get

$$12/16 \times 7000 = 5250 \text{ gr.} \div 105 = 50 \text{ gr. sliver.}$$

I would advise using the same draft in the second carding to give the same weight sliver. This draft, with a 12-ounce lap, takes away the excess wear and tear on a card that a 14-ounce lap would cause, and will turn out more even and well carded sliver. The draft between the doffer and calender rolls in the coiler should not be excessive. Again, he should go over his card gearings to prove that he has a constant draft on all of them.

His spoons work right on his drawing frames and his draft seems to be correct. He should go through the gearing to see that he has the same draft on all machines. He should not have too much or too little draft between his front roll and calender rolls.

His sliver should have been properly coiled in the cans, allowing free and easy drawing out of the cans to the back feed rolls, doing away with all strain and consequent stretch. Proper mixing of cans from cards will help in the doubling. I think it a good practice to file a large enough hole in the trumpets so that too light a finished sliver will allow the stop motion to work and that when a too heavy sliver comes, the hole will be too small and the sliver will break back. The bad work is thus caught and



FACTORIES AND WAREHOUSES

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can be remedied by changing the draft gears to give the required weight of sliver. Running six ends of 50-grain sliver and having a draft slightly under six on his first and enough over six in the second to compensate and give a 50-grain sliver will turn out a good sliver ready for the slubber. He should size the sliver at least twice a day from each head.

On the slubbers and speeders, he must see that the rolls are properly covered, well cleaned and oiled and kept so. Take a frame that has rolls dirty with waste under the saddle and not properly oiled; go through the rolls cleaning and oiling, and notice the difference in draft when the top rolls rotate freely and operate on the work as intended. The sliver from the cans should be drawn freely from the cans occasioning no stretch and the guides should be kept clean and polished. On the speeders, the skewers and stops should be kept right so that the roving can unwind without strain. There should not be too much tension between the front roll and bobbin, for as the bobbin builds, stretch will be caused and result in more uneven work.

50-grain sliver = .166 hk. draft of 4.21 = .70 hk. roving.

Doublings should take place on intermediate, fine speeders and spinning frames. Where single and double roving occurs, the tenders should be required to unwind it. A good plan is to have a separate mark for each tender and when bad work occurs, the source of it is obvious. Have the bad work broken out if in the creel and returned to the maker of the roving to fix. Often when an end breaks back the tender will not see it and considerable roving will be wound single on the bobbin before breaking. Again, when an end breaks in front it will be twisted in with an adjacent end and wound on the bobbin. These must be remedied and unwound before piecing to get good results.

Two ends of .70 hk.= .140 draft of 5.07 = 2 hk. roving.

Two ends of 2 hk. = 1 draft of 6 = 6 hk. roving.

On the spinning frame, the rolls must be kept in good shape, skewers and steps, etc., must be looked after. Under clearers must be kept clean so that the waste will not be twisted in the yarn after the end has been picked.

Two ends 6 hk. = 3 hk. draft of 10 = 30s yarn.

Sizing must be taken on speeders at least once a day, two bobbins from each frame and four bobbins from each spinning frame. Encourage the help to watch for bad and uneven work, singles and doubles, split laps, etc.

I believe "C. W.'s" trouble lies mainly in too heavy a lap and excessive card draft, lack of doubling on frames and possibly in a poor humidifying system. Excessive card draft tends to uneven work; doubling increases the chance of running thick and thin places together so that a better average should prevail. The yarn on one bobbin is not produced from one lap, one card sliver or drawing sliver or one slubber or speeder bobbin, but from a mixture or combination of them. The probability of the yarn being more even is enhanced by doubling. The question of humidity is one of great importance. The temperature and relative humidity should be kept as nearly the same in all departments as possible and should keep a constant amount of moisture throughout the entire production.

This organization is one that is working today and turns out as nearly even work as any mill I have seen, consistent with production. However, these are but my opinions. Let us hear from others. Doc. (N. C.)

Applying Ball Bearings to Picker Aprons and Evener Rolls.

EDITOR COTTON:

There has been some discussion in the pages of COTTON of the question of uneven finisher laps, and a number of excellent suggestions have been made along various lines leading to a reduction of the variation in yard-by-yard weight of laps. This matter has also been similarly discussed in meetings of the Southern Textile Association. It is recognized as an extremely important question, for even running work cannot be expected from uneven laps.

Particularly in mills where a small number of doublings are obtained is the matter of uniform laps important. Where doublings run over a million they help very materially to overcome original inequalities in lap, but mills that only get a few hundred doublings find that slight variations in yard-by-yard weight of laps seriously affect the yarn. This is particularly true where goods have to be napped, as a slight variation in the weight of yarn will cause thin spots in the finished cloth after napping.

The uniformity of finisher laps depends almost entirely upon the evener, and practically all variations in the weight of these laps may be charged up to improper operation of the evener mechanism. Consider the construction of the evener. A row of treadles (16 on one much used make of picker) forming a "piano-motion" bears on the sheet of cotton going to the beater. Each of these treadles is pivoted so that it may move freely, and connected to an arm to move the belt on the variable speed cone pulley that drives the feed rolls. If any one of the treadles is raised or lowered, it causes a shifting of the cone belt and consequent change of feed roll speed.

As the sheet of cotton passes by these treadles they move up or down as the lap is thick or thin under them. While thick places may be balanced by an equal number of thin places a large part of the time, whenever the average thickness of the lap changes, the evener will either speed up or slow down the feed rolls to take care of it. Theoretically then, the lapper should deliver a perfectly uniform lap from the screens, but practice will not do this, because the evener motion is [illegible] per cent efficient mechanically.

The more efficiently the evener can be made to operate, however, the more nearly can the lap be made perfectly uniform. Evidently then, the evener deserves a good deal of attention.

A recent writer in COTTON pointed the fact that in some experiments he had blocked the evener belt shifter so that it ran in the middle of the cone all the time, and that he got about as good lap off the finisher under these conditions as he had when the evener was allowed to move the belt. This seems to be a very stiff arraignment of the efficiency of the evener motion, as well as a strong argument in favor of giving the hoppers a good deal of attention, for the laps in the test made would have certainly been too uneven to use if the hoppers had not been working very efficiently.

However, it is not to be expected that the hoppers will deliver a thoroughly uniform amount of cotton all the time, and the lack of uniformity must be compensated for by the evener motions on the intermediate and finisher pickers.

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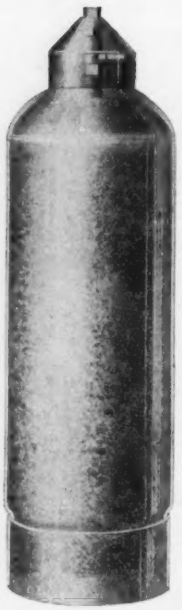

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Admitting that the theoretical function of the evener is to make uniform laps, we must look for the causes of non-uniform work. The principal cause for this in the opinion of the writer is the slippage of the cone belt that drives the feed rolls, and it is with this trouble that this article mainly deals.

After setting an evener to deliver the required amount of lap per doff, everything depends on whether the cone belt slips or not. The "piano-motion" of the evener compensates for very small changes in the thickness of lap, and the link equalizing motion transmits the effect of the sum of the lateral variations to the cone belt, so that the feed will either be increased or diminished to put the right amount of cotton over the feed rolls. It is therefore vital that the changes as registered by the "piano-motion" be accurately transmitted to the feed rolls. Any slippage of the evener cone belt means that this change in thickness of lap will not cause a corresponding change in feed to take care of it.

As the feed rolls are speeded up by running the cone belt farther down on the small end of the cone, where it is called upon to do more work with less pulley surface, there is always a tendency toward belt-slip when the belt is shifted for increased feed. The greater the demand for feed increase, the greater the likelihood of slippage, so that in extreme cases the belt may slip to such an extent that instead of speeding up the feed rolls and taking care of a thin place, the feed may be actually slowed down, making the thin spot worse.

The picker room attendant, weighing laps as they are doffed, will continually adjust the evener to try to care for these variations that make themselves felt in the total weight of the laps. By frequent adjustment, the total weight may be kept within fair limits, but the yard-by-yard variation cannot be controlled as long as the belt is slipping.

That belt-slip is a well recognized cause of trouble with uneven laps is amply proved by the number of mills where cones have been covered with belt, cloth, cord, or emery paint, or where wider belts have been put on. All of these compromissary measures have serious objections. Where some soft covering is put over the cone, the belt, running about 98 per cent of the time within narrow limits, will wear a slight groove so that there is no longer a true conical surface, and the ratio of cone speed to the traverse motion of the shifting arm will not be right, because no matter which way the belt is shifted it has to climb out of a groove, and if the groove is very bad, shifting the belt about an inch down on the small end of the cone will actually slow up the feed instead of increasing it. Where pulley paint is used it quickly wears off, and wide belts are objectionable because they are less flexible than narrow ones and do not shift as readily, so that the evener becomes sluggish.

Furthermore, all of these measures seek to overcome a difficulty; none of them attemp to remove it. To remove the trouble, the friction load imposed on the cone belt must be reduced to a minimum, so that the only duty of the belt is to feed cotton to the beater. This friction load may be reduced by frequently cleaning all chokes from the ends of the apron rolls, evener rolls and feed rolls; keeping the shafts up to size on all rolls so that they fill the holes and allow no lost motion and admission of dirt; keeping all bearings well oiled, and seeing that the back roll on the apron is lined up properly so that it does not bind.

Another alternative is to apply an anti-friction bearing to each roll, and this is certainly the most efficient way of meeting the situation. Ball bearings may be easily applied to all rollers at small expense, and give far better results than can be expected from the plain bearings under any but the most favorable conditions. Ball bearings eliminate about 85 per cent of the friction; require oiling only three or four times a year; allow no waste oil that will collect cotton and form chokes; and will run with as little friction at full load as at no load.

An important advantage of the ball bearing on the evener roll is that it will always maintain perfect adjustment. Plain bearings that become badly worn will affect the evenness of the work, as the roller has a tendency to climb in its bushing when this gets dry and the neck of the roller seizes the metal of the bushing. This climbing causes a pressure on the "piano-motion" that operates the shifting arm, and if the old bearings are badly worn this lost motion may have serious results.

The application of ball bearings standardizes the amount of expected load on an apron drive. The load on the cone belts is greatly reduced, and in practically every case an improvement in work will be noted. Tests have been made with ball bearing equipped machines and those without ball bearings, and in a number of instances as good results have been obtained with the old style bearings by cleaning and careful oiling as could be obtained with the ball bearings. In daily work, however, where neither bearing gets any special attention, the ball bearing quickly demonstrates its advantages, and shows that it is not affected by neglect as is the plain bearing.

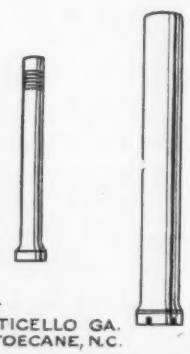
The amount of benefit that can be expected from the use of ball bearings in this application varies of course with local operating conditions. Where unusually heavy laps are made, or where laps are made too quickly, the ball bearings usually make a very marked improvement. One mill reported that in 3,000 laps they lost only 27; another, in a test of one week on a finisher, said they lost no laps at all. Where conditions are more favorable to the proper operation of the lapper, less startling results may be expected, but as the application of the bearings is very inexpensive, it is doubtful if there are many cases where it would not pay to use them.

The bearings may be mounted with or without housings. The simplest and most inexpensive way being to mount them in the frame without housings, as the expense of making the housings is thus eliminated, and the resulting installation is more compact and rigid.

A large number of southern mills are now using these bearings, and it would be interesting to have some letters from superintendents who have made tests on them. If some of those who read this article will write to COTTON on this subject it will certainly be of interest and value to everyone who is having trouble with uneven laps.

A. P. Aldrich, Jr. (S. C.)

Refuse to be discouraged. If a dull day comes along it gives you time to think out plans to make the next one brighter.



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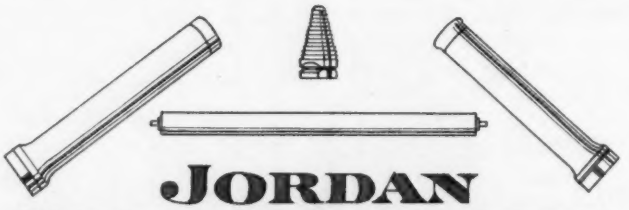

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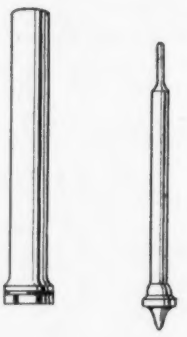

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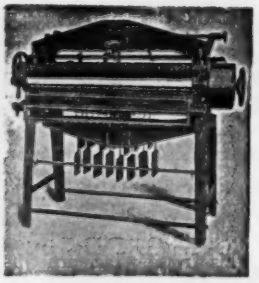

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Finishing Questions Answered.

EDITOR COTTON:

I should like to see in the "How Other Men Manage" Department the suggestions of other readers as to the best way to remove stains and oil spots from khaki cloth. Also, has anyone ever added vinegar or other liquid or solid to the water in order to give a certain smartness or stiffness to the material when being pressed? I would also like to have some information regarding the best way to press cheap corduroys, moleskins, fustians, etc.

M. A. T. (N. J.)

EDITOR COTTON:

In replying to "M. A. T." I am assuming that the khaki to which he refers is the regulation khaki drill used for U. S. A. soldiers' field uniforms and which is composed wholly of cotton and dyed in the piece.

Regarding stains on khaki, I might say that there are many stains which cannot be removed from dyed goods without also removing some of the color and leaving a light place, but so far as fatty substances are concerned, these may be first extracted by means of a solvent, preferably tetrachloride of carbon, and the site of the stain is then touched successively (without intermediate washings) with undiluted ammonia, oxygenol solution, and oxalic acid solution.

After the last treatment, the place is thoroughly washed, dried and brushed over with alcohol, and then dried completely. The following mixture will remove almost any stain of a greasy nature, such as oil, grease, varnish, petroleum, tar, wax, oil paints, etc., without injuring the color of the goods:

Carbon tetrachloride, 650 parts; acetic ether, 100 parts; alcohol, 100 parts; alkali soap (soluble in benzine), 8 parts; benzine, 142 parts. This will not injure the material or the dye, and acts easily and quickly, gives off no smell, is noninflammable, and evaporates without a trace. The stain is moistened with this mixture, lightly brushed and finally dried with a clean cotton cloth. A better way is to moisten with the mixture and put the stain between sheets of blotting paper and press a hot flat-iron on it and keep on changing the position of the blotting paper until the stain is removed.

After dyeing, the khaki goods should be thoroughly washed and then further washed off in a hot solution of silicate of soda, mangled through cold water and dried; the silicate imparts a firm smooth feel to the goods and has the effect of making the color fast to lactic acid which is the test to show the fastness of the color to sweat. In some cases the goods are boiled in silicate, then soaped and then run without washing through acetic acid at seven degrees Twaddle and dried up. This makes them shower proof and acid proof.

The finishing of cotton corduroys requires great care. As soon as they have been dyed they are hung up to dry and then brushed to raise the pile. The brushing is done across from selvage to selvage, and the brush never goes back over the same path. After being brushed, the face side of the goods is bees-waxed on a suitable machine. The goods are then sized on the back with a mixture composed of 70 pounds of white dextrin; 25 pounds Glauber's salt; 15 pounds well soaked glue; 15 pounds softening; 15 pounds Turkey red oil 50 per cent; fill a cask with cold water and put in the glue, softening and the dextrin. Then heat until all are dissolved and then add the other materials and boil again for a few moments. This mixture must then be diluted with water down to 12 to 18 degrees Twaddle as may be required. This size must be applied on the back of the goods and they must be dried on the dry cans with the face next to the cans.

When dry the goods are brushed again as before, sheared and again waxed on the face with stearine; they are again brushed, waxed again with beeswax and again brushed. This same process will answer also for moleskins, fustians and velveteens. The goods undergoing treatment should be run continuously on a range of machinery, being padded on the back with the sizing mixture on a two-bowled mangle, passing from this to 5 to 7 drying cans where it is partially dried on the face, from this over a stretcher on to the blanket press roller.

The blanket pressing machine consists essentially of a large revolving drum generally about six feet in diameter and which must be kept smooth and polished; around this cylinder a stout, endless traveling blanket is guided by adjustable guide rollers. The goods from the stretcher pass directly between the blanket and the metal cylinder which is heated by means of steam to a pressure of about 60 pounds.

The goods pass almost completely around the circumference of the cylinder, with their face to it, and between it and the blanket. By adjusting differently the tension on the guide rollers and the speed of the cylinder various degrees of luster and feel can be obtained.

The finish obtained on this machine is exceptionally pleasing, giving, as it does, a full bodied and wooly nature to the fabric.

W. B. (Maine.)

Why "C. W.'s" Work Is Uneven.

EDITOR COTTON:

I think "C. W.'s" first trouble is that his lap is too heavy. He should not think of using a lap heavier than 11 ounces; I think 10 ounces would be much better.

His draft on his breaker card is entirely too short, and his setting of the feed plate to the licker-in is too close on the staple he is using. He should set his feed plate to a 22 gauge. At present he injures his staple and weakens it at his licker-in until it is impossible for it to draw out even.

He does not state his draft on the drawing nor the weight of the finished drawing, so it is hard to decide just where his trouble is. If I was going to run his job on the cotton he is using, I would start off with a 10-ounce lap, using a draft of 98 to 102 on my cards, and on my first drawing I would use a draft of 5.40; on the finished drawing a draft of 5.60; and on the slubbers a draft of 3.50; on the intermediates a draft of 5.00 and on the fine frames about 6.00.

There are many other things that would cause uneven work, such as the air draft on the pickers not being right, the setting of rolls on drawing or fly frames, or there may be causes in the spinning room, but I think that the greatest trouble is that the weight of the lap is too great and

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there is not enough draft on the cards and too much on the slubbers and intermediates. Ted (Ga.)

Another Opinion on Card Clothing Wire.

EDITOR COTTON:

I am interested in the subject which "E. D. W." brought up for discussion and upon which "Wash (Conn.)" commented in the September issue of COTTON. The objective points of the card are so well known that little thought need be given to this subject, but card clothing—well, that's different.

The main object under discussion here seems to me to be a question of getting down to fundamentals, but the point is, what are the fundamentals? In the first place, let us define each individual item as it comes up for discussion, the first one being the reason why card clothing is changed at all.

In this connection it is interesting to note that cotton varies in the diameter of an individual fiber from .0003 to .0007 of an inch, and this variation in staple diameter is the real reason for a change in numbers of card clothing being necessary. The explanation of this is very simple, as a little detail will show. Coarse numbers of card cloth- are used on short staple stock. Why? Because the shortest staple stock is the one having the largest diameter of each individual fiber, while the finer numbers of card clothing are used on the long staple stock, because an individual fiber of this type of cotton has the smallest diameter. Right away I sense the question, "But what has that got to do with it?" Well, it has got just this much to do with it: as the carding cylinder revolves at the rate of 2,109 feet per minute, a high surface velocity is maintained which creates the air current which is so essential to the well being of any card, be it clothed with fine, medium or coarse card clothing.

As a means of illustration, take two individual cards running side by side, on the same weight of lap, both producing the same weight sliver; it will be easily seen after a little thought that if one of these cards is running short staple stock, while the other is running long staple stock, and the fibers on each card are distributed over a prescribed area of the card clothing, the long staple fibers will greatly exceed in number the short staple fibers, over the same area.

As every practical carder knows, the flat settings are invariably the same for both long and short staple stock, but, due to the length of the staple, the long staple stock meets with more resistance when being drawn through the top flats, than does the short staple stock. As it is very essential that any cotton receive a thorough carding, the points per square foot are increased on the flats to accommodate the decreased diameter of the individual fiber when using long staple stock. This, coupled with the fact that there is more resistance due to the additional length of fiber in actual contact with the top flats at one time, necessitates the increasing of the points per square foot on the carding cylinder, in order that this resistance may be overcome and the retaining capacity of the carding cylinder be thus increased, as it is very essential that all of the good stock be retained.

The next item up for discussion is the reason why coars-

er numbers of card clothing are used on the carding cylinder than on the flats and doffer. It is very seldom, if ever, that short staple stock is anywhere near as clean as long staple stock, and partly owing to this fact, the space between the points of the card clothing must be greater on short staple stock in order that the foreign matter contained in the cotton may imbed itself between the points of the card clothing until removed by the stripping brush. As the amount of foreign matter removed by the top flats is only a very small percentage of the amount of stock actually passing through the card, and considering also that all stock passing through the card must be handled by the carding cylinder, it will be seen by a close study of conditions, coupled with the fact that the carding cylinder must retain the waste imbedded between the points of the card clothing from one stripping time to the next, while the top flats are stripped clean at every revolution, that the card clothing on the carding cylinder must of necessity be coarser than that with which the flats are covered.

The main fact to be considered is that the flats are the members which accomplish the carding of the stock and that the product which the card produces depends for its quality upon the kind of work which the top flats are doing, and the objective—or we might call it the mission—of the top flats, is to provide the highest type of carding efficiency without risking the danger of the flats becoming choked or filled up.

There is one point upon which "Wash" touches that to my mind needs a little more explanation, and that is where he says, "if a clean stock is to be run I would have number 34s on the flats also, but for uneven staple and dirty stock I would use 33s." I do not see why he should only change the flat clothing in a case of this kind, as right here he strikes at the very heart of the carding problem. I know this is a much discussed point and that there are a good many men who think as "Wash" does on this point, but I should be interested to read their real reasons for such action.

For instance, take about any kind of cotton that is grown, and there is a certain amount of uneven staple contained therein. Of course, some bales will contain more than others, but it is safe to say that each and every bale of cotton has its share of this type of stock. What I should like to have "Wash" explain is why he would change only his flat clothing. Is it on account of the uneven staple, or is it on account of the dirty stock? It strikes me that the uneven staple would require one type of treatment which would call for the finer type of card clothing on the top flats, while the low grade dirty feature of the cotton would call for more space between the card clothing points both on the carding cylinder and flats, but still retaining the difference between the numbers of same for the reasons already explained. Now if we have both the uneven staple and the dirty stock to deal with at one time, would it not be better to have, say, a 32s, on the carding cylinder and a 33s on the top flats?

We now come to the reason why the doffer cylinder is clothed with finer counts of card clothing than the carding cylinder, and this may be very easily explained as follows: In passing through the card the stock is fed by the licker-in to the carding cylinder, containing a lot of impurities which are removed before the stock reaches the doffer cylinder; therefore, apart from the slight amount of foreign matter which imbeds itself between the points of the card clothing on the doffer cylinder during the transfer of the stock from the carding to the doffer cylinder, we may say that no carding or cleaning action takes place at this point, so the stock practically contains no impurities as it passes forward to the doffer and on to the coiler. It may be said with perfect confidence, then, that the doffer is covered with finer card clothing so as to assure the transfer of the cotton to the doffer cylinder, and also because there is no urgent necessity to leave space between the points for any foreign matter of consequence.

The exact amount which the card clothing with which the flats and doffer cylinder are clothed, is finer than that used on the carding cylinder, can only be determined by experience, and experience has so far, at least, proven to me and a majority of others that the amount of variation is 10 numbers in the English method or 1 number in the American method. Benjamin (Conn.)

Three Card Room Questions.

EDITOR COTTON:

I would like to have you publish the following questions in COTTON, so that I can get the views of "Wash," and any other contributors, on these subjects:

First: I have some Woonsocket roving frames that run over at the bottom when the frame gets from one-half full on until, sometimes, when it knocks off. What effect would it have if I were to change my lay gear, and put on a gear with a couple of more teeth in it and use a greater tension? Would it remedy this difficulty?

Second: I would also like to have the views of "Wash," and the others, on whether a medium fan speed on the picker, where the cotton is very trashy, is better than a high fan speed. By "medium fan speed" I mean just enough speed to give a good sheet of cotton to the screen. Will there be more trash and dirt fall through the grid bars than when a high fan speed is used, thus giving a much cleaner lap?

Third: Is there a remedy that will stop small particles of cotton seed and other foreign matter from lodging in the card flats? If so, what is it? Rocky Road (N. C.)

A Complete Detailed Hank Sheet.

EDITOR COTTON:

A complete detailed hank sheet is required in every card room, no matter how small, and in this letter I will try to explain and illustrate one which I think is exceptionally good.

The advantage of this hank sheet is that a daily detailed report for the previous day's work can be kept. This is desirable in a large room where it would be troublesome to remember until the end of the week, when the payroll is being made up, just what frames had been stopped for roving, bobbins, or help.

With the system I have in mind, the first thing to be done is to have the second hand or some other responsible person go around the slubbers and speeders as late in the day as possible and take the hank clock readings and record them in a book kept for the purpose, which would be ruled as illustrated in Figure 1.

The next morning the readings are copied on the hank

SLUBBERS (OR SPEEDERS) ROOM NO. ____

FRAME NO.	AUG. 15 MON.	16 TUES.	17 WED.	18 THUR.	19 FRI.	20 SAT.	22 MON.	23 TUES.	24 WED.	25 THUR.	26 FRI.	27 SAT.
1	19	28	36	45	54	59						
2	34	43	52	60	69	73						
3	67	75	83	92	100	5						
4												
5												
6												

Fig. 1

BLANK MILLS

WEEK ENDING _____ CARDING DEPARTMENT B

NAME	FRAME NO.	MONDAY CLOCK	MONDAY HANKS	TUESDAY CLOCK	TUESDAY HANKS	WEDNESDAY CLOCK	WEDNESDAY HANKS	THURSDAY CLOCK	THURSDAY HANKS	FRIDAY CLOCK	FRIDAY HANKS	SATURDAY CLOCK	SATURDAY HANKS	CLOCK		TOTAL HANKS	SPIN. NO.	AMOUNT	SIZE	REMARKS
	1																		.54	
	2																		"	
	3																		.68	
	4																		1.55	
	5																		2.50	
	6																			
	36																			
DAILY TOTAL HKS																			.54	
" " "																			.68	
" " "																			1.55	
" " "																			2.50	
DAILY PRODUCTION																			.54	
"																			.68	
"																			1.55	
"																			2.50	
TOTAL PRODUCT FOR WEEK																				

Fig. 2

sheet which is gotten up in the manner shown in Figure 2.

The previous Saturday's or last working day's reading is to be copied under the subtitle "Clock" in the column for Monday, then the reading taken Monday afternoon is set down in the "Clock" column for Tuesday, and the reading of Tuesday afternoon is put down in Wednesday's "Clock" column, and so on. In this way, the reading in the "Clock" column is the reading of the hank clock on that particular frame as it reads at the start of work in the morning. All this work on the sheet, Fig. 2, is to be put down in black ink.

Then the difference between the reading in the "Clock" column of Monday and Tuesday is put down, as the number of hanks made, in the "Hanks" column under Monday, the same is done with the reading of Tuesday and Wednesday and so on during the week, giving the number of hanks each frame has made each day.

Adding these several days' number of hanks gives the total number of hanks for that frame, which is put down in the "Total Hanks" column at the right hand side of the sheet, and then by multiplying this number by the piece-work rate, the amount the operator will draw. Thus, having each operator's production and pay recorded in this manner, they will have no trouble in seeing what they did during the week, when the sheet is posted for their benefit.

(*Continued on page* 139.)

KNITTING SECTION

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Made upon two sets of needles

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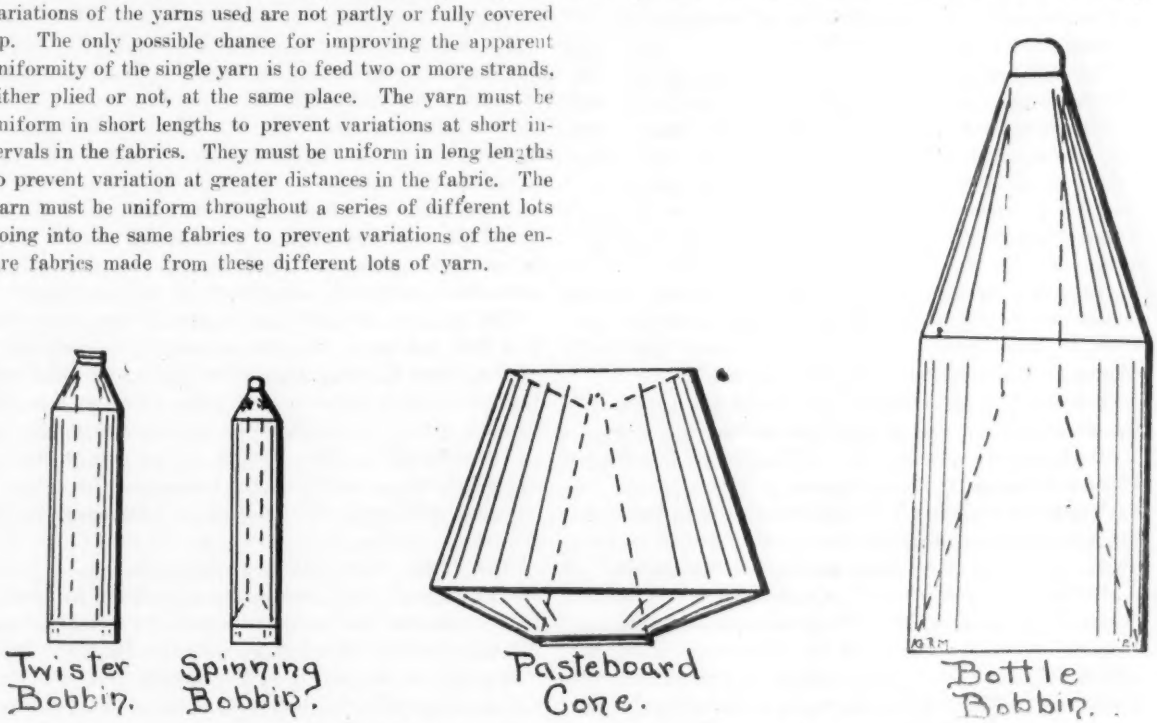
Knitting Yarns and Their Preparation

BY G. R. MERRILL.

There are few processes that require as carefully prepared yarn as knitting. There must be care exercised in every phase of the work connected with it.

The more desirable characteristics in a knitting yarn are, in order of their importance—uniformity, elasticity, flexibility and strength. In obtaining a maximum of any one of these characteristics, except uniformity, some of the others must be sacrificed. Consequently, it is necessary to balance the advantages of one against the other and then proportion them in such a way that the result is as near that desired as possible.

A knitted fabric is built up of one yarn, or one series of yarns, formed into loops. There is no intermingling of two sets of yarns, as in weaving, and consequently, the variations of the yarns used are not partly or fully covered up. The only possible chance for improving the apparent uniformity of the single yarn is to feed two or more strands, either plied or not, at the same place. The yarn must be uniform in short lengths to prevent variations at short intervals in the fabrics. They must be uniform in long lengths to prevent variation at greater distances in the fabric. The yarn must be uniform throughout a series of different lots going into the same fabrics to prevent variations of the entire fabrics made from these different lots of yarn.



A COMPARISON OF THE SIZE OF YARN PACKAGES. THE "EMPTIES" ARE SHOWN IN DOTTED LINES.

This uniformity, which is so essential in knitting yarns, the lack of which is responsible for a great quantity of imperfect knitting, must be obtained in the manufacture of the yarn. There is no way of making a perfect fabric from a non-uniform yarn. Various treatments may reduce the apparent variations, but they never can entirely eliminate them. Great care in the manufacturing, combined with the use of the combing operations, gives the most desirable yarn from the point of view of uniformity.

As the yarn is drawn into the loops which compose the knitted fabric it is often subject to a tension. Any possible strain of this sort can be taken up by an elastic yarn, for it will recover its original condition when the strain is released. An inelastic yarn, subjected to any strain of this sort, may be weakened or even broken and so be of no value.

To obtain this elasticity in the yarn is possible when care is taken with respect to the spinning and twisting, if it is a ply yarn. Having once obtained an elastic yarn, the tension on it in any subsequent operation, such as winding, should be as little as possible. This, of course, will vary somewhat with the yarn and the type of package being made. Do not have the yarn under such tension that, after it has stood in the package a short time, it will have much less elasticity than it had before being wound. If the tension is very great during winding, as it sometimes is when winding from skeins, it is advisable to re-wind these packages to prevent the loss of the elasticity which the yarn has.

To form a yarn into the loops constituting a knitted fabric, it must be flexible. A stiff yarn does not readily adapt itself to the loop formation. To obtain this flexibility, the yarn must be made of soft material. Stiff, harsh fibers cannot readily be used for knitting, because they will not bend easily into the loops forming the fabric.

In addition to being of soft material, the yarn should be soft twisted. The flexibility of soft twisted yarns is greater than that of hard twisted yarns. Soft twisted yarns tend to give the fabric a softer feel which often is another point gained when obtaining this flexibility.

After these other characteristics are satisfied, or when they are obtained to as great a degree as desired, the yarn is then made as strong as possible.

To produce a satisfactory, uniform fabric, knitting yarns should be in packages which will give the most uniform tension possible. The best yarn will make only a half satisfactory fabric if the tension on the yarn varies, because

the greater tension will cause stitches to be tighter than those made with less tension on the yarn. This fabric will, then, show streaks or lines across it.

The form of package, which is best adapted to give a uniform tension, is one where the yarn is wound on a conical surface. This conical surface should be so designed that the yarn does not drag over the surface as it is drawn off or unwound.

All yarns in their final manufacturing operation are on small bobbins, either from the spinning or twisting frames. Yarns dyed in the skein often go to the knitters in a skein form. Undyed yarns often go on their small bobbins. Some yarns are bought on pasteboard tubes or cones.

Skeins and small bobbin packages of yarn must be wound on some kind of a conical package for knitting. Yarns on pasteboard tubes should be treated similarly because the yarn draws over the surface of the package enough to vary the tension. Yarns already on cones need not be rewound, but very often the advantages gained by rewniding are worth the additional cost.

The two commonest types of yarn package are built on pasteboard cones and bottle bobbins. The pasteboard cone is extensively used and is just a cone of pasteboard. The bottle bobbin is a bobbin with a conical base and a long body or neck. It is something like the ordinary filling bobbin. Where more yarn is desired in one package, or where slippery yarns are being used, the bobbin is more commonly used.

Yarns are rewound to obtain uniform tension, to obtain a long length in one package, to remove bunches and knots, to insure against "open ends," to remove "cobwebs," if present, and to inspect ply yarns for ply.

Uniform tension is obtained by having the package of the correct shape as has already been shown.

The large package makes it possible to have a long length of yarn contained in one continuous piece.

Winders are equipped with adjustable devices for catching bunches and knots, thus often saving broken needles, "bung ups," or the cloth from running off the needles.

Places where ends are not tied together in a package are spoken of as "open ends." Frequently, the operator, particularly on winders, does not tie the ends together, but rather just starts the end by winding it around the partially built package. On a knitting machine without a yarn stop motion, this will allow the cloth to run off the needles. Since the cost of starting the machine again is considerable, some knitters prefer to rewind even coned yarns to prevent having this trouble.

Some yarn packages have "cobwebs" or threads which for some reason are not placed on the winding surface but are thrown across the end. These are apt to cause breakage or at least uneven tension and can best be handled by rewinding.

Where ply yarns are being used, winding gives a chance to inspect it, to see that it is of the right number of strands throughout the package.

In conclusion ,it may be said that knitting yarns should be very carefully made; that uniformity is more essential than in most other uses of yarn and should be the first consideration; that elasticity and flexibility are necessary and must be obtained by sacrificing some strength; and that these yarns should be prepared for knitting in conical packages but should not be strained in winding by tension enough to destroy their elasticity.

Among the Knitting Mills.

Frank E. Hollen, Whippewa Falls, Wis., is planning for the establishment of a new mill for the manufacture of cotton hosiery and mittens. A new company is being organized to operate the mill.

The Co-Ed Knitting Mills, Philadelphia, Pa., has awarded a contract for the construction of its proposed new two-story mill, 50 x 110 feet, estimated to cost about $30,000. Harry Bachove is treasurer.

The Holland Knitting Co., 675 Glenmore Ave., Brooklyn, N. Y., has filed notice of dissolution under state laws.

Fire recently damaged a portion of the knitting mill of J. F. Dast & Sons, Schuykill Haven, Pa., with a loss estimated at about $16,000. The fire was caused by an explosion of a tank used in connection with manufacturing.

The Fisher Knitting Company, Buffalo, N. Y., is planning for the installation of new machine tools and general operating equipment at its mills.

The Endurance Knitting Co., 760 East Venango St., Philadelphia, Pa., has awarded a contract for the erection of a new mill.

Application has been made for a state charter for the United Globe Knitting Mills, Philadelphia, for the manufacture of knit goods. The company is represented by Samuel Feldman, 1306 Commonwealth Trust Bldg., Philadelphia.

The property of the United Knitwear Mills, Inc., New York City, has been sold following bankruptcy proceedings.

The Fern Knitting Mills, 568 Tenth St., West New York, N. J., has filed notice of organization to manufacture knit goods. Louis Shifrin heads the company.

The Belgrade Knitting Mills, New Cumberland, Pa., are taking bids on revised plans for the erection of their new two-story addition, 50 x 100 feet, and estimated to cost $50,000.

The Junior Hosiery Co., Philadelphia, Pa., manufacturers of infants' fancy silk socks, are building an addition to their plant at the southeast corner of Coral Street and Wheatsheaf Lane. The cost is said to be about $18,000.

The Wateo Knitting Co., Phoenixville, Pa., will erect a three-story, 36 x 80 foot, addition to its present plant.

Interwoven Mills, Inc., has purchased property at Harper's Ferry, West Virginia, and will erect a hosiery mill. About 50 operatives will be employed.

The Ocala Knitting and Manufacturing Company, Ocala, Florida, has been reorganized and put in operation under the name of Florida Knitting Mills.

J. C. Farley, Jr., Opelika, Ala., contemplates entering the production of women's fashioned silk hosiery, and has purchased 260-needle, 3½-inch cylinder knitting machines for that purpose. The stocking will have a 20-inch boot of pure thread silk. The foot, heel and toe will be re-inforced with 70s/2 and single 70s mercerized combed peeler yarns.

The Revere Knitting Mills, Inc., Malden, Mass., has construction under way on a new two-story addition, 50 x 100 feet, estimated to cost about $35,000.

The Strutwear Knitting Co., Minneapolis, Minn., has plans under way for the erection of a new five-story mill, estimated to cost approximately $50,000.

The Knit Goods Market

Business in knitted goods moved up in November, but prices did not follow apace with increases in cost of basic raw materials. Jobbers bought rather heavily of hosiery for the first quarter of 1922, and considerable spring underwear, and began operating in a modest way in sweaters for the fall of 1922. And while they were buying very sparingly for the remainder of 1921, some few contracted for heavy weight underwear and wool hosiery for the winter of 1922-23. In fact, in some quarters more interest was shown in 1922 heather hosiery of wool, and silk and wool in combination than in staple goods for next spring.

Jobbers, the shrewdest element in merchandising, set out to make a cleanup of 1921 stocks, determined that their December 31 inventories shall show the smallest holdings of goods at the end of any year in the last decade. Banks watch inventories closely in these days of putting the final touches to deflation, and jobbers realize that bankers place a higher estimate on good accounts receivable than merchandise for which there may be an uncertain outlet. Hence what distributors bought for spot, it was proposed, should be shipped to their customers before January 1. At the rate of their buying, assuming the retailer is purchasing commensurately with his reported sales, the jobbers will make the nearest approach to a complete cleanup ever attained. They are especially desirous that no 1921 winter underwear be carried into 1922, for they cannot shake off the feeling that so long as prices are higher than the lowest in their recollection there is danger of further declines. They do not assume to predict when or to what extent knit goods will recede in value, but necessarily they insist on being prepared for it when it does occur.

Wool hosiery is one of the items in knit goods on which almost any jobber would be willing to take a hazard, provided they could obtain deliveries sufficiently early to assure an outlet in the retail trade. Demand for wool, and silk and wool heathers has been phenominal, and there is no indication it will diminish during the present distributing season. Jobbers and retailers—the larger department stores—are in the market and have been for more than a month, taking every case in sight and calling for more. Manufacturers selling to retailers and whose production is inadequate for their trade, have been among the better customers of some of the big jobber mills. Fancy wool hosiery, more especially the clocked and otherwise embroidered for ladies, are among the few hosiery lines sold for fall of 1922, for delivery around August. Several jobbers have simply duplicated their 1921 orders, in advance of any showing of mills' complete sample lines. It is understood that some new and very attractive lines of wool heathers will be shown shortly. Innovations in hosiery have followed in close succession this year and, contrary to experience, most of them have taken hold in a way that presages for them a profitable degree of popularity for another season or two.

Fancy wool hosiery is believed to be paving the way to an enormous business in silk stockings for 1922. The heavier stocking was a factor in blocking the movement having for its object the wearing of somewhat longer skirts. Paris decreed that skirts must be longer. The American woman—more particularly the American girl—did not approve, and hosiery manufacturers came to her support in supplying a stocking of greater warmth. The short skirt was destined to continue short for winter when there was provided stockings to protect limbs that otherwise would be the first point of attack of piercing winter winds, and, considering the variety of shades and colors that must be worn to harmonize with next summer's outerwear, it seems not an exaggerated prediction that there will be required during the season one dozen pairs of silk stockings for every wearer of short skirts. And that this is the view of some large jobbers is indicated by the fact several have been in the market willing to contract for full fashioned hosiery for the first six months of 1922.

When announcement was made that the strike in sixteen full fashioned mills which as a whole had been idle for the equivalent of six months had been settled, a number of dealers jumped to the conclusion that now there would be full fashioned silk hosiery to spare, and there was observed diminished interest. In the meantime the Berkshire Knitting Mills and the Nolde & Horst Company, both in Reading, had sold their output of ladies full fashioned silks up to next June. Silk hosiery was quiet mainly because wool goods were receiving so much attention, and by the end of November there was presented no less activity than a month earlier. By the time Harrington & Waring opened their lines and the previously idle Philadelphia mills were again on the market, about the middle of the month silks were the best 1922 seller and few mills were soliciting business.

The production of full fashioned silk hosiery for the next few months is not going to be as large as the trade supposed. In the first place, while the strikers returned to work in open shops, they are reported not getting off maximum output. The presence of non-union operatives in the factories cuts into the quick of unionism, and there is continual friction between the vanquished strikers and those who stepped into places at machines which for a time were deserted. During the night, recently, a full fashioned knitting machine operated by a non-union knitter was purposely damaged and put out of commission by some person unknown to the mill management.

When manufacturers and strikers agreed on terms under which the unionists returned to work the latter promised there should be no restriction on production. This promise is not being adhered to, and there appears to be a determination to keep output so curtailed as to insure a job for every union knitter, and still more. A manufacturer whose business was running ahead of his production announced an intention to operate the mill over time or employ two shifts. The union let it be known this would be unsatisfactory to their organization.

The strike began last January and was assumed to have terminated about the first of November will not be finally settled until the manufacturers affected get rid of the notion that it is necessary, for the sake of peace, to give some kind of recognition to the union clamoring for the closed shop. This has been made apparent in Philadelphia, where the mills of the Glen Knitting Company, Thomas E. Brown & Sons and Henry Brown & Sons are operating as exclusively open shops, refusing employment to any knitter who quitted his machine to take part in the strike. These

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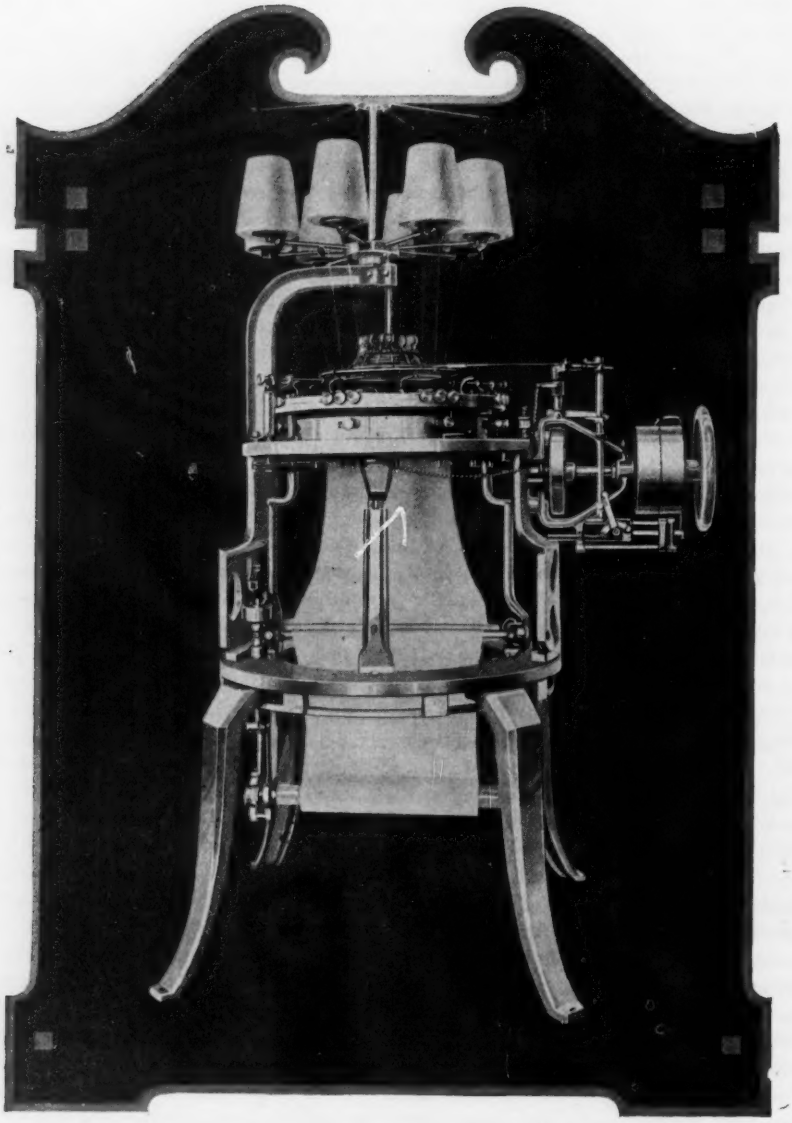

Wildman Spring Needle Body Machine

Many circular knitting machines are more or less accurate.

Wildman Circular Knitting Machinery is made with perfect accuracy of every moving part.

Therefore, it can be operated at its maximum production capacity without risk to the quality of the cloth. This is one reason for its undisputed, world-wide prestige with users.

On request we will send the "Wildman Spring Needle Body Machine Instruction Book" giving detailed illustrations and descriptions of every important part of the machine.

TRADE MFG MARK

WILDMAN MFG. CO.
NORRISTOWN, PA.

mills in the last six months have made trained knitters of men wholly inexperienced when they entered the factories, and some are drawing as much as $65 a week of 54 hours. The wage scale will remain high so long as demand for hosiery continues as keen as it now is. When hosiery prices drop wages also will drop. But that is not going to be witnessed until there are more knitters than now are available.

It is likely the first adverse effect, from the mill viewpoint, of the increased production of full fashioned silk hosiery will be felt in mills making seamless lines. The latter are on a better footing as a result of the introduction of the fashion-marking device brought out perhaps a year ago by Scott & Williams and now being duplicated, in a way, without infringing on the patent. Thus far there is enough difference in the prices of the full fashioned and fashion-marked to hold the latter in good demand. But by the end of the year there will have been installed since last December 500 or more full fashioned machines. These will average 10 dozens a day per machine. Figuring on 300 working days, the 1922 production should be 1,500,000 dozen pairs more than for 1920. Since then there has been a material increase in the quantities of seamless silk hosiery produced. The short skirt and, in sequence, the more general use of silk and fancy wool hosiery, to say nothing of a flood of novelties, has made somewhat hard sledding for mills engaged solely with combed and mercerized stockings.

Mercerized half hose, however, is coming stronger, and a big, wide market is foreseen by some manufacturers. A Pennsylvania mill selling the retail trade is so confident of a better demand for mercerized socks that it is bringing out a new number under its own brand, made in its own mill. Hitherto this manufacturer has bought mercerized half hose for his trade, using his machines in the production of silk socks. These machines now are to be diverted to mercerized lines, which should go to retailers around $4 to $4.25 a dozen. A southern mill, selling to jobbers, recently booked orders at $2.75. A retailer mill which has been selling at $3.25 will advance the price to $3.85 on January 1, when its silk half hose will be moved up to $6.85 from $6.25. The direct-to-dealer mills have been booking business in so large volume that it is difficult to find an explanation for the comparatively light buying by jobbers. The latter, evidently, have not been getting what was regarded their share of the business, and appear to losing many good accounts, for retailer mills everywhere report receiving new ones.

For the jobber who cannot see a $2.75 value in full mercerized half hose there is a sock with mercerized leg and combed top, heel, toe and sole, at $1.77½ and a like line at 10 cents higher. These do not fit in with the trade of some jobbers, who have no use for anything between all-mercerized and all combed. A very good line of the latter, with double sole and high spliced heel, has been sold up to March 1 at $1.75 a dozen. The selling agent for the mill making this line has been eager for several weeks to obtain an additional mill account—in fact, three other selling agencies and commission houses might be mentioned as in the market for hosiery lines other than silk and wool.

Mercerized hosiery for women has been causing no excitement in the trade for some time. There is too much variation in price as among a number of manufacturers. One mill is holding a few cases at $3 a dozen, for A1 goods, while another has refused to sell to jobbers at less than $3.50. Women's mercerized hosiery is not receiving from jobbers the attention to which such goods are entitled. A southern manufacturer a short time ago tried out his line at a price which, according to his cost sheets, would have netted him eleven cents per dozen profit. Finding the stockings would not move at that figure he went down to his price of last July and took a loss of 15 cents a dozen. Some jobbers were afraid they would not get deliveries at a price spelling so much loss, and some of those eager to take advantage of the sacrifices of a manufacturer proved not desirable accounts. It is a safe assertion that no mercerized hosiery worthy the name will be sold for more than a few weeks at the lower prices heard at this time. And the sooner the low-price manufacturers abandon the notion that they can exist on losses the sooner will jobbers buy the goods at replacement plus.

A wide price range is shown in misses' mercerized ribbed stockings. One mill, which ought to be getting more, is reported having booked business recently at $2.75 a dozen. Another mill is known to have sold in the last few weeks at $3.25, and another is holding for $3.70. It may be a little while before the latter takes on much business at that price but when it does it will have a profit, and that is what some manufacturers of ribs are not having.

Misses' coarse gauge ribs settled down to a dollar a dozen proposition during November, with a range of five to 10 cents above and 2½ cents lower. There seems no doubt this type of rib would easily bring $1.05 if manufacturers were to confer and compare costs. One explanation for the unduly low prices is that several manufacturers have so increased production as to materially reduce overhead. Coarse carded ribs have not been as hard hit as combed and mercerized by the three-quarter and seven-eighth lengths made popular by the roll top, and ought to be bringing more money to manufacturers, whose net return on five dozens probably is less than the average jobber gets out of one.

The really aristocratic roll-top ribbed stocking for misses is sold to jobbers at a price which presupposes the retailer will sell it at $1.50 a pair. It is silk clocked and has a knitted band of silk running through the roll. It is stated by the manufacturer that when it was introduced to the jobbing trade it made no hit, because of the price, but that now jobbers who were among those to pass it by are buying in amazing quantity. Building stockings out of range of staples has injected into the hosiery industry an element of gambling that makes the business as interesting as betting on a horse race, and the chances of winning are about the same.

A plan for putting more of the element of aristocracy into cheap carded stockings has been evolved by Benjamin Heyman, of Heyman & Hawthorn, who announces that shortly he will have on the market 176 needle hose clocked. He says it has been found possible to name a price to jobbers that will enable them to put it in retail stores at 25 cents a pair.

This firm is showing a vertically striped seamless-made stocking for women. It may well be offered in mercerized and artificial silk plated on mercerized, in plain colors, with stripes in contrasting shades. Heyman & Hawthorn, with offices in New York and Philadelphia, recently bought the Real Art full fashioned silk hosiery mill in the latter

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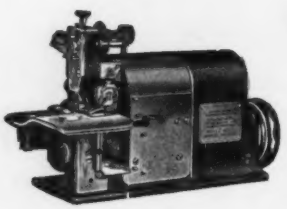

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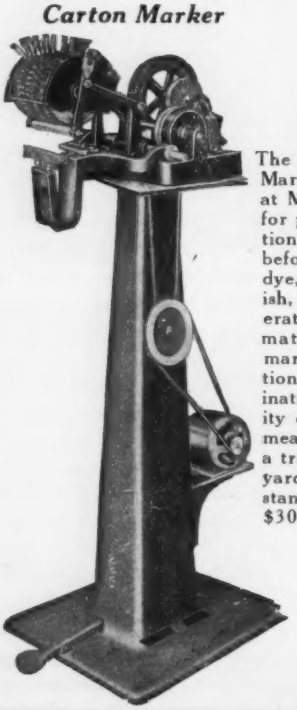
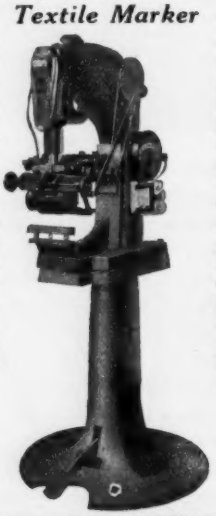
Carton Marker



The Carton Marker is for printing the size, descriptive names or colors, style numbers, or lot numbers, on the carton or the label, giving an absolute uniform result on all your containers; eliminating the poor and blurry mark that is usually obtained by the use of hand stamps.
Over 500 of these equipments are in operation.
Is adapted for marking the set-up, folding or telescopic carton.
Price of standard equipment, $300.

Textile Marker

The Standard Textile Marker, designated at M-5 equipment, is for placing identification marks on pieces before going into the dye, bleach and finish, or any other operation in which the material requires marks for identification purposes, eliminating any possibility of error or short-measure. Gives you a true check on your yardage. Price for standard equipment $300.



Coupon Marker

The Coupon Marker used in connection with piecework payroll systems, where the coupon method is operated. Prints at the rate of 375 a minute. Has rotating type wheels which enable the operator to set various numbers at will, and is the solution for marking where this system is installed. There are over 400 of these in use.
Price of standard equipment, $250.

MARKEM MACHINE CO.

232 Summer St., BOSTON, MASS.

city, and the former owners have bought ground on which to erect a larger factory building.

An innovation in ladies stockings that at present writing has not given evidence of causing any excitement is provided with drawing strings, as it were. A trade publication supplies the following description:

A "V" shaped cut about three inches deep is made in the double top, the edges containing eyelets. A silk ribbon passes around the leg, through a hem sewn in the lower part of the top. The ends of the ribbon meet at the bottom of the "V" and are laced zig-zag through the eyelets and tied in a bow at the top. The "V" closes over a woven silk backing conforming to the tongue of a shoe.

The application of lacers to stockings for supporting garters is covered by a patent which also protects infants' roll top socks cut and eyeleted for ribbon lacing.

Business in low end hosiery probably would be as satisfactory as the transactions in some of the more expensive lines and recent novelties for the time in the class of staples, if manufacturers maintained a closer acquaintance, conferred more frequently and gave more respect to the deliberations in the comparatively few meetings in which cost, prices and conditions are discussed. A group of manufacturers will be in accord as to cost and adequate price, and will disperse after there has been arrived at a general understanding as to the market value of a stocking, terms, etc., each bent on a sort of go-as-you-please policy, with the result that jobbers no longer attach the slightest importance to the reports of the action by manufacturers in their assemblages.

Any figures that might be given as representative of the market for carded stockings of 200 needles and under would be uninforming and perhaps misleading. One can hear three quotations on misses' coarse gauge ribs, for example, ranging from 97½ cents to $1.05 a dozen.

A manufacturer who claims that his 176 needle sock is the best made has established a price of $1.15 and he is not receding from it. Three lower quotations, beginning with one dollar a dozen, are heard. Cut toe socks ought to be sold at $1 to $1.05 as a minimum, and $1.10 ought to be the minimum for the full seamless.

The fact that the volume of business in low end hosiery is badly out of balance as among mills is shown in a shading of prices by some manufacturers while others are holding firm or adding 2½ cents to a nickel a dozen. Other evidences of uneven distribution of sales is supplied in additions of equipment in some few of the larger mills, while others are operating on a basis of 60 to 70 per cent of capacity. It may be assumed that the manufacturer who is increasing his output of cheap hosiery is doing so as a means of reducing overhead and putting cost at an irreducible minimum. There is going to be the keenest kind of competition among low end hosiery mills, and those which cannot produce at the lowest possible cost may have hard sledding; some may drop out of the procession.

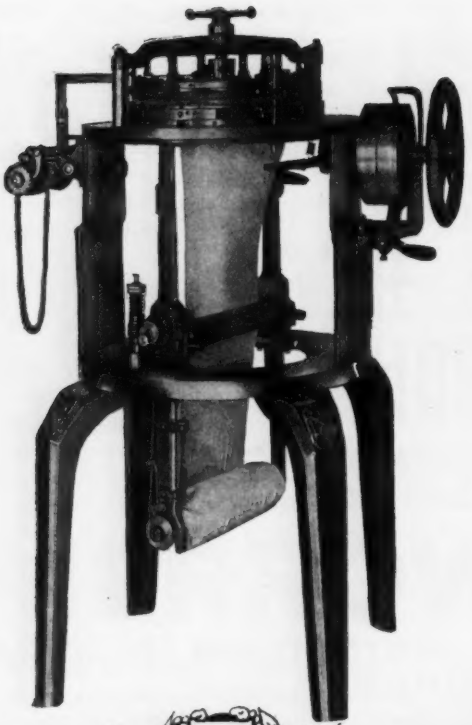
The South, it cannot be disputed, enjoys an advantageous position in the matter of low cost of production. If this were not true, it is probable the Taubel, Scott, Kitzmiller Company would not have established plants in several southern states. It need not be surprising if other northern manufacturers move southward. It is notorious that in Philadelphia cost is higher than in probably any other hosiery center. For one reason, labor unions were dominating in many mills. They have been routed, more properly speaking, repulsed, but the hurtful influence of the closed shop is yet to be overcome, and there is less assurance of steady employment in the average Philadelphia hosiery mill than in those of the South. There has been too much expansion in the business of making cheap hosiery in the South and not enough attention to the ever increasing demand for better fabric and finish. Sound advice to some of those North Carolina knitters would be: "Get out of the rut."

Another bit of advice which it might be well to heed is, "Safeguard against cancellation of orders." Some of the cancellations that may be offered will be intended merely, as in the past, a means for procuring recessions from contract prices, as instanced in a recent transaction in so strong a seller as wool hosiery. A jobber's order called for deliveries in September, October and November. The September shipment was past due by two days when the jobber served notice that as the goods had not come through on schedule the order was to be cancelled so far as September was concerned. The mill made no reply and neglected to ship out the October delivery. The expected happened: the jobber made demand for the merchandise. He was advised that as he had cancelled as to September the manufacturer had taken the liberty of cancelling the order in its entirety. The jobber had no redress and was caught short of wool hose at the time of sharpest demand. He is paying the penalty in higher prices for what he regarded as cleverness.

It seems not an improbability that the availability of imported hosiery may be made a basis for offering cancellations. Foreign stockings are being landed in this country at about and less than the cost of manufacture here. A full fashioned combed sock from Germany comparing with a Pennsylvania line going to jobbers at $1.85 a dozen, cost an importer $1.15, including duty and all charges. Women's full fashioned mercerized brought from Germany could be sold by jobbers at less than $6 at a profit, and a jobber boasts that he can get $7 and above. Ladies' full fashioned silks also can be brought in at prices with which domestic manufacturers could not compete. Receipts of the latter are not in disturbingly large quantities, but the fact that such goods are obtainable is made use of by importing dealers as a club for beating down the prices of domestic goods.

A jobber states that if he were certain the existing tariff schedules would not be disturbed inside of six months he would buy heavily of German-made hosiery. Another is in Germany to pay spot cash for large quantities for immediate delivery. It is practically necessary to get spot goods to buy safely, for if the mark declines radically after purchase, the goods ordinarily will not be shipped to the buyer. It is authoritatively stated that at all times there are in Germany buyers prepared to pay cash for goods that can be put in transportation immediately. An American jobber well provided with funds sailed for Germany early in November to pick up goods that were sold when the mark was of greater value, American dollar basis.

While no jobber would place reliance on imports exclusively and must maintain a relationship with American manufacturers, many nevertheless will play the imported against the domestic until he has accomplished his purpose or gives up in fear neither foreign nor domestic goods will be available when wanted. In the light of a two-year ex-



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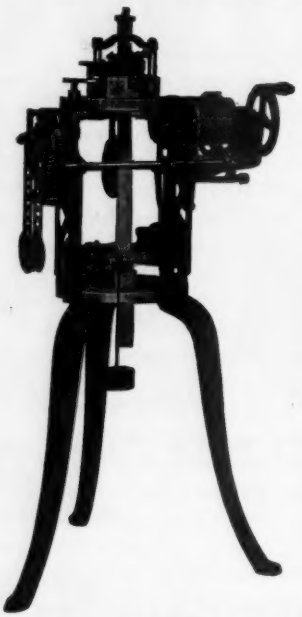

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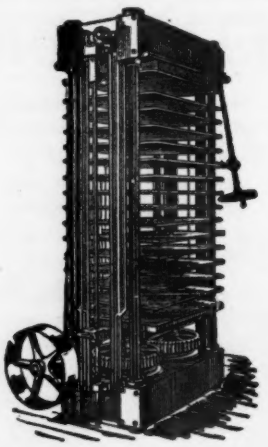

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perience in wobbly markets it requires no stretch of sincerity to predict that there are many buyers committed for deliveries of domestic hosiery who, if they were offered comparable goods from abroad at lower prices, would be as ready to cancel as they would to accept a mill executive's invitation to luncheon at the Arkwright Club. And it should not be overlooked that those at present thriving on imports and bullying the American manufacturer were solely dependent on American mills for several years prior to the armistice.

Manufacturers of heavy weight underwear have had their troubles no less than makers of hosiery are having theirs. Some time after the armistice, it will be recalled, the United States government sold, for a mere song, many millions of dollars worth of war textiles to the French government. These included large quantities of underwear, which the French government sold to speculators, who in turn exported it to the United States. The goods seem to have been timed to reach this country when the wniter underwear market was most inviting for a dumping of heavy garments. With hundreds of thousands of shirts and drawers made to government specifications suddenly made available, at prices about a fourth of present production cost it was inevitable that jobbers would show alarm over a possible surplus.

To make matters worse for manufacturers, jobbers were being offered large lots of fresh war underwear direct from United States government warehouses. A Philadelphia dealer bought 50,000 garments. It is understood the cost to him was 42 cents a garment. At any rate, he is offering them at $7.50 a dozen in bales of 10 dozens. The government, while the fighting was going on, bought the underwear from a manufacturer in Utica, N. Y., and paid $22.50 a dozen. The public is buying it in Army and Navy retail stores at $1.10 a garment, a little more than one-half of what it cost Uncle Sam, and nearly three times as much as Uncle Samuel got for it from the Philadelphia jobber.

The government underwear from U. S. warehouses is a more dangerous competitor of garments made for the civilian trade than are the shirts and drawers bought from the French speculators to whom France sold what this country had virtually given away. There lurks the fear among some jobbers that the stuff from France may include a lot of salvaged garments—shirts and drawers which saw service on the bodies of fighting men and which has been reconditioned. Such jobbers have a dread of being suspected of handling second-hand underwear picked up on the battle fields of France. There is objection to the garments, too, because of the fact they are sold to jobbers in bales of 100 garments of a size, making it obligatory on buyers to take, perhaps, sizes which they do not want, in order to obtain those which they do want. Manufacturers who have been adversely affected by the dumping of underwear would be less critical of the authorities responsible for the flooding of the market at this time if the consumer had been permitted to enjoy the benefit of what the government lost.

There was good demand throughout November for small lots of winter underwear for immediate delivery, and it frequently happened that a jobber had to do quite a bit of shopping around before he could find what he wanted, to be shipped right away. Manufacturers completing orders were in no position to take on much immediate shipment business. They could promise deliveries in December, but jobbers wanted goods at once, for the more snappy season that had set in. They wanted merchandise to reach them in time to be shipped out among retailers before the end of December. None was to be carried into 1922, it was declared. From the manner of restricting quantities it may be assumed that the trade will make a cleanup, and in getting rid of 1921 goods many mills will precede some jobbers.

Latterly, it is noted, there has been a better demand for shirts and drawers, which were for a time neglected, when buyers were specifying union suits. The latter have been making heavy gains on the single garments since 1909. The production of suits increased by 25,000,000 dozens in the five year period from 1909 to 1914, according to the census figures for the latter, and shirts and drawers fell off in proportion. Whether the same ratio of gain and loss was continued since 1914 may not be known until the census returns for 1919 have been made public.

In summer underwear, knitted union suits showed no gain, inroads having been made by the nainsooks, the cut-and-sewed variety, against which the manufacturers of the knitted are about to wage a campaign.

While nothing is known as to when will occur the formal opening of heavy weight underwear for the fall of 1922, some few mills already have booked orders. One mill shows a few quite large orders, for deliveries in January, February and March, buyers no doubt being given the benefit of unusually attractive prices. Orders also have been placed for deliveries along in July and August.

Duplicate orders for underwear for next summer have been coming to a number of mills, and a few are receiving enough business to take care of approximately daily production, with initial orders as a good background. Jobbers are paying advances, having been on the road long enough to work themselves into a new price position.

Neither the spurt in cotton of a few weeks ago nor the decline about the middle of November had any radical effect on the underwear market, nor was it affected by the recent order for a railroad strike which was rescinded before the date set for the walkout. It is apparent the trade is buying for needs as they develop and is not paying much heed to developments which might be expected to leave a market impress.

The Yarn Market.

There was a general softening of rates on all grades of yarn on the Philadelphia market during the past few weeks. There were fluctuations and changes in certain classes that were occasioned by the movements of the raw cotton market, but as a whole, prices dropped from one cent to five cents on the pound.

An examination of quotations shows that over a period of thirty days, the reduction in prices on 30s southern single carded skeins was from 31 cents to 29 cents; this followed a continued reduction, and brought these yarns down to the lowest price in twelve or fourteen weeks in this market. In single warps from the South, there was a little more strength, 20s falling a cent from 35 to 34 cents. The ultimate drop in southern skeins and warps two-ply, over this period, ranged from one cent to three cents.

In the northern section of the published list, combed peeler yarn on cones held up pretty well, but the carded

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yarn group showed a precipitation averaging about five cents a pound.

Prices during the whole month were irregular, and prices offered and selling rates continued under the average quotations of spinners. The small permanent decline occurring in prices during the month was attributed to two causes, the cotton market and speculators. Spinners, those in the South especially, held to their quotations pretty firmly, and as a class seemed unable to understand why their representatives could not dispose of yarn with the stocks of jobbers and dealers so depleted. However, this attitude of the manufacturers was accounted for by some factors by the fact that spinners generally were underestimating the amount of stock yarns on the market.

As a whole, spinners were mighty slow to make concessions, and held out for prices that at least would allow them a small margin of profit. There was less disposition to sell merely for the sake of getting the order.

Another feature of the yarn situation that developed during the last month was that spinners are figuring their manufacturing costs much closer than they were some time ago. An instance of this was given in the case of a mill that made a tentative price of 45 cents on a certain yarn order and then, within an hour, telephoned the buyer that a second figuring had show that the cost of making the yarn was such that they could not accept the order at less than 47 cents.

With an unsettled market, spinners holding firm, buyers reported to be stocked up, and irregular prices, business during the month continued dull, most of the orders placed being of the hand-to-mouth variety and for filling-in requirements.

Quotations on the Philadelphia market on November 18 follow:

Southern Single Skeins.

4s to 8s	28	10s	29
12s	30	14s	30½
16s	31½	20s	31½
24s	35	26s	36
30s	38		

Southern Carded Warps.

8s	29½	10s	30½
12s	31	14s	31½
16s	32½	20s	34
26s	36	30s	38
40s	53 @55		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slack	28½
8-2-4 tingled tubes	23½
8-3-4 hard white warp-twist	28
8-3-4 hard twist waste	22½

Southern Two-Ply Skeins.

8s	29	10s	30
12s	30½	14s	31
16s	32	20s	34
24s	35	26s	36
30s	38	40s	52 @55

Southern Two-Ply Warps.

8s	30	10s	31
12s	31½	14s	32
16s	33	20s	34 @35
24s	35½ @36	36s	36½ @37
30s	38 @39	40s	55

Southern Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	60	20s	62
24s	65	30s	68 @70
40s	85 @90	50s	95 @$1.00
60s	$1.10@$1.15	70s	$1 25@ $1.30
80s	$1 45@$1.50		

Southern Frame Spun Carded Yarn on Cones.

8s	30	10s	31
12s	31½	14s	32½
18s	33½	20s	34
22s	34½ @35	24s	35½ @36
26s	36½ @37	30s	38
40s	55		
30s double carded			45
30s tying-in			34

Northern Mule Spun Carded Yarn Cones.

10s	35	12s	36
14s	37	16s	38
18s	39	20s	40
24s	43	26s	45
30s	48	40s	60 @62

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	50	12s	51
14s	52	16s	53
18s	54	20s	55
22s	57	26s	64
28s	66	30s	69
36s	77	38s	79
40s	81		

A Complete Detailed Hank Sheet.

(*Continued from page* 126.)

At the bottom of the hank sheet will be found a line marked "Daily Total Hanks." The hanks of all frames on a certain size are added and placed opposite that size. This is done with each size that is being run, thus giving the total hanks made that day on that size of roving.

Then lower down is the line for "Daily Production," and it is a very simple matter to figure the number of pounds made each day in each size of roving.

Adding the "Daily Total Hanks" we get the total hanks per week in each size; and likewise, adding the "Daily Production" gives the "Weekly Production" in each size. Then, to finish it, by adding again the sum of the weekly production of each size, the total production for the week in the room can be secured.

The "Remarks" column in this sheet is very helpful. Suppose frame No. 2 had been changed Wednesday noon from .54 hank roving to .68 hank roving. Then in the "Remarks" column the fact would be noted, and in small figures the clock reading at that time would be placed in the upper part of the square for the clock reading of that day.

Or, suppose the girl running that frame stayed out or was changed Thursday. This fact also could be set down promptly, thereby eliminating all the trouble of trying to remember at the end of the week just who was working on each frame all the week.

The width of the sheet is about fifteen inches and it can be any length desired, according to how many frames are to be recorded on it. A good way is to have a large board with these sheets tacked on it. This makes it easy to handle them and also allows them to be hung on the wall in the office.

Although this sheet may seem a little complicated, it is really very simple, if each day's work is put down and computed every morning, and it certainly is very convenient for an overseer to be able to know at any time just what his production for the previous day was, or to know just what machines have been operated and by whom, or if they have been stopped for repairs or any other reason.

J. S. B. (Mass.)

Asks Information on Spinning Drafts.

EDITOR COTTON:

We see a great deal about long spinning drafts nowa-days, but very little about short drafts. I should like to see in the "How Other Men Manage" Department the opinions of some of the readers on the subject of short drafts in the spinning room, and am giving herewith an example that might be used as a base, so to speak, for some of this discussion:

If a mill is using a 3 hank speeder roving from the card room, and makes 16s, 14s, 12s and 10s out of this roving, running two ends on spinning, what are the opinions of the readers concerning these drafts. Are any of them too short? If so, why, and what effect will it have on the yarn?

B. E. (Texas)

The Mission of the Fly Frame Cone Belt.

EDITOR COTTON:

"T. A. D. (Ga.)" shows his good American spirit in his letter entitled "Cone Belts and Tension" in the July issue.

The gentleman is dead right when he states, "Further, I believe in coming back at one another on certain points in the articles we write, it does make things interesting and besides it brings out all there is in the writers."

That's why I am a critic, for when you get after the other fellow he comes back at you with what I term a reserved margin, and, as our friend "T.A.D." points out, it brings out all there is in the writer, and ofcourse all are benefited. I always try to be original and convey the best that's in me.

In the fourth paragraph of his letter in the July number, "T. A. D." says, "About the cone belt being an essential feature, that is already understood, and its duties, the mission that it has to perform, etc." Continuing in the same paragraph, he adds, "In the first place, what is belt dressing put on a belt for? To make it pull, of course. Well then, supposing that the roving frame cone belt is two-thirds on its way to a full doff of the bobbins when the dressing is applied, will it not make the ends (or tension) tighter?" That statement, to my mind, is a confession that "T. A. D." has not carefully considered the duties and mission of the cone belt.

Now let us refer to the letter from a firm building fly frames which was quoted in my letter in the June number. On page 626, in the first paragraph, it says, "With the Houldsworth compound the bobbin and the spindle revolve at the same speed without the additional compounded speed or additional impetus caused from the cone." In other words, any fly frame equipped with the new so-called differential motion has a high speed bottom cone, and the cone belt must at all times be in a condition to overcome this impetus and the compounded speed, while on any fly frame equipped with the Houldsworth motion the cone belt must be in such a condition to overcome the compounded speed only.

Therefore, we apply dressing to a cone belt to make it hold the proper position to suit the intermediate speed and hold the relationship of the surface speed of the front roll and bobbin. In every case, a cone belt will bother at the beginning of the set, or when the frame is started, never after the frame is up to speed; and for two reasons. Again referring to the letter in the June issue, in the first paragraph it states, "We think it follows that whether the cones drive or are driven they really are governors." Therefore, if a cone belt was slipping continually from the beginning of the set, it would be impossible to run a full set, for the fact that the relationship of the surface speed of the front roll and bobbin would be destroyed.

Again referring to the letter in question, in the seventh paragraph it says, "Another factor in this complicated problem is that the pressure of the paddles on the bobbin is nearly sufficient to keep the spindles up to speed after the frame, as a whole, has been put up to speed, even though at that minute the train of gears driving the spindles from the jack shaft were disengaged. It seemed to us that this would be true; we tried it and demonstrated it to be so."

From the foregoing, "T. A. D." must admit that it requires very little pull from the cone belt to drive the bobbins. It proves also that it is impossible for a cone belt to slip throughout the set and still remain an agent to hold conditions equal. So, as stated, we apply belt dressing so it will hold the same position. When a cone belt is dirty or dry, even if fairly tight, it is not equal to the resistance of the compounded speed and the high speed of the bottom cone, so the belt slips to the small end of the cone and the ends slacken. Again, it must not be forgotten that when a frame is started no pressure exists at the termination of the paddles. Therefore, when a fly frame is started, the cone belt must overcome the compounded speed, and the impetus and weight of the bobbins.

I think the foregoing is enough for "T. A. D." and the readers of this department to show them that belt dressing can be applied to cone belts at any stage of the set. On the other hand, what causes the ends to slacken on a damp day? It is not the cone belt; if it was, we could easily tighten all cone belts and be on Easy Street for the rest of the day. On a damp day, we all admit that the ends on all fly frames will slacken even though the cone belt is very tight. What is the reason? The answer is friction. Everything is damp, and the surfaces over which the strand passes from the boss of the flyer to the termination of the presser finger offers a certain amount of resistance to the strand.

The web guide on the card offers a slight resistance to the web and we have a sagging on a damp day. The same can be said of the trumpets on the drawing frames which causes a slack web on a damp day. It is this resistance that makes the bobbins firmer on a dry day.

In regard to the type of belt used as far back as 1890, as described in "T. A. D.'s" letter, I will admit it was a good runner, and it was a pity they were ever discarded.

In my letter entitled "Slipping Cone Belts," which appeared in the April issue of COTTON, in the fifth paragraph I make the following statement, "Let us suppose that we apply belt dressing when the set is one-half full. The only damage that could possibly occur is that the frame would run a little tighter." When that was written, I had the position of the belt in mind. Any belt curled and running against the shipper causes a certain amount of slackness, simply because it is not in the position it should be and will not run a perfect set of roving. Wash (Conn.)

A Question for Spinners.

EDITOR COTTON:

I would like to have the following questions answered in your Practical Discussion Department.

What is the cause of roving coming through the rolls on a spinning frame without being drawn? And what is the remedy? We are running 1 1/16-inch cotton on numbers 4s to 30s, and in order to draw the roving I find it necessary to open the rolls for 1¼-inch cotton, and also to take the weight off the middle rolls, otherwise the roving comes through the front rolls without being drawn, making deep grooves in the rolls. The roving is wound on the bobbin very hard. B. C. A. (N. J.)

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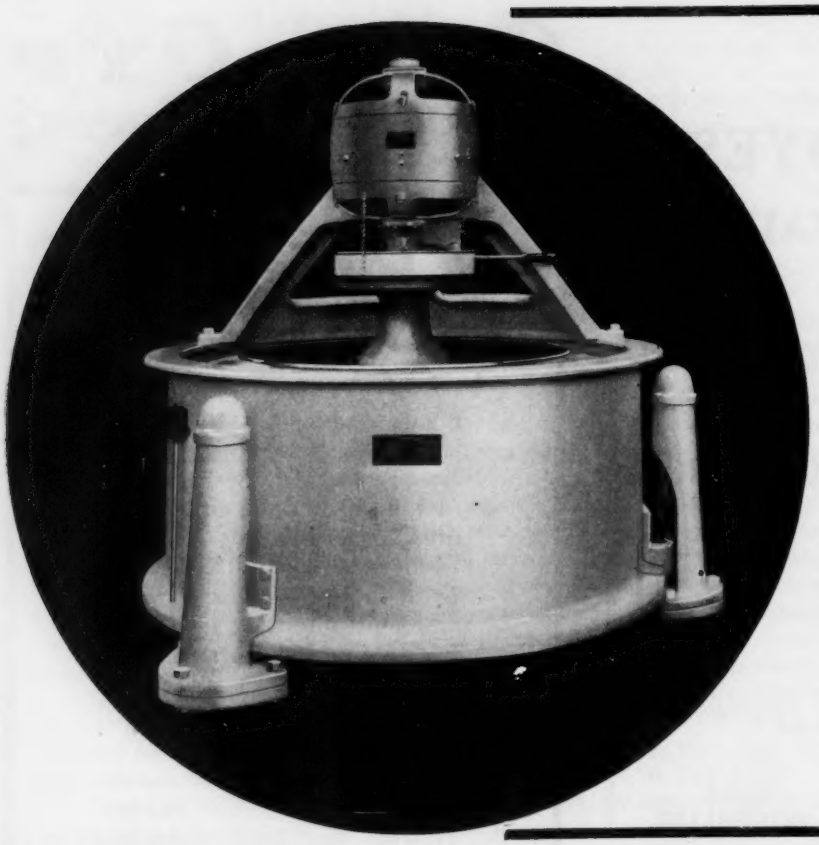

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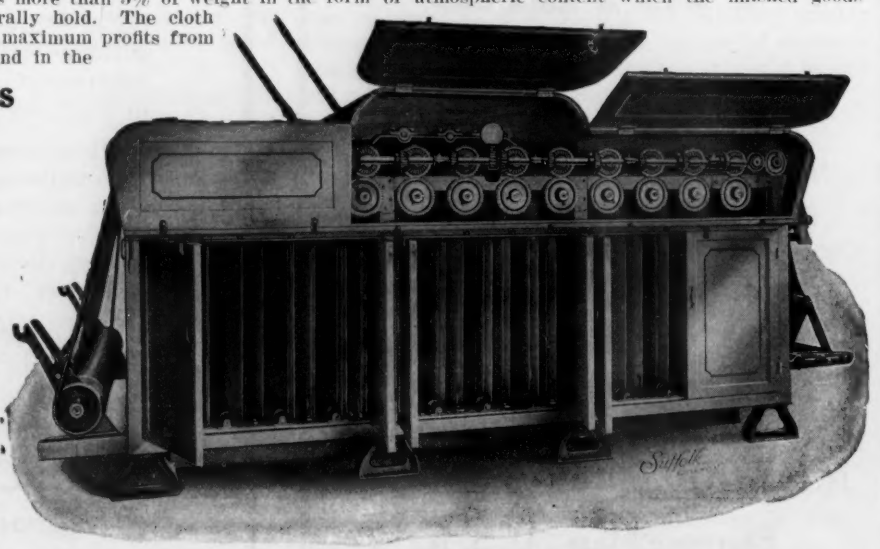

which is a patented process, based on the operation of natural laws. It takes the dry, hot material as it leaves the dryer or press and restores the weight and dimension to the right amount that a good cloth should have. The fabric leaves the machine thoroughly cooled, minus static electricity which of course improves the handle, and there is imparted to it a rich softness entirely free from shadiness so often caused in uneven cooling. The finish is perfect and the color uniform.

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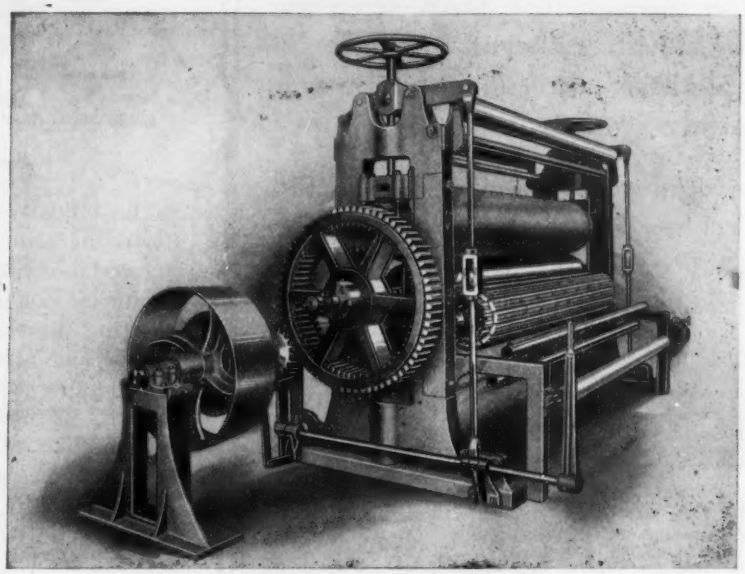


CALENDER (Three Rolls)

WE are 101 years old in experience and in reputation. We are still young in our eager, wide-awake readiness to improve Butterworth Finishing Machinery wherever possible. Our experts are always on the lookout for better ways to solve your textile finishing problems—which we make ours.

H. W. BUTTERWORTH & SONS CO.

Established 1820

PHILADELPHIA

PROVIDENCE OFFICE
Turk's Head Building

Canadian Representative
W. J. WESTAWAY COMPANY
Hamilton, Ontario, Canada

AGEING MACHINES
BLEACHING MACHINES
DRYING MACHINES
SINGEING MACHINES
MERCERIZING RANGES
HYDRAULIC PRESSES

FINISHING
Butterworth
MACHINERY

DYEING MACHINES
SOAPING MACHINES
TENTERING MACHINES
MANGLES (all kinds)
CALENDERS (all kinds)
COLOR KETTLES
CELL DRYERS

Insures Correct Shades

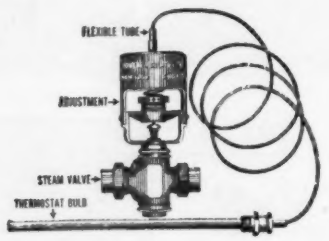
POWERS Automatic Themostatic Regulators control the temperature with scientific exactness. The sensitive thermostat bulb responds to the slightest variation of temperature, keeping it always constant.

POWERS Regulators are easily installed and adjusted. They watch the heat ALL the time and enable your operatives to devote themselves entirely to productive work.

THE POWERS REGULATOR CO
Specialists in Automatic Heat Control

985 Architects Bldg., New York; 2761 Greenview Ave., Chicago; 596 Boston Wharf Bldg., Boston; Canadian Powers Regulator Co., Ltd., Toronto.

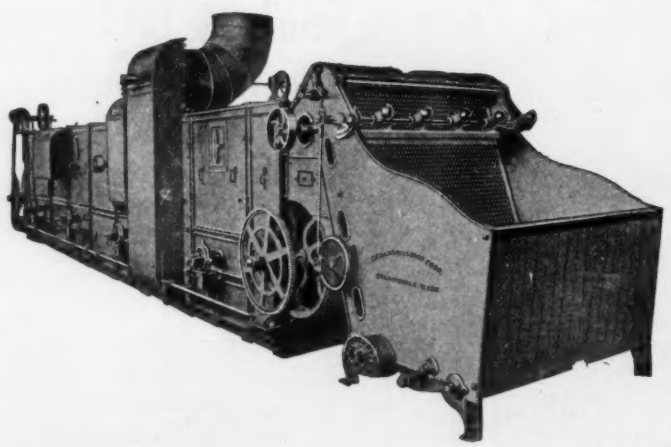
Southern Representative:
Ira L. Griffin, Charlotte, N. C.



This illustrates the Powers Regulator No. 11, especially adapted to control of liquid temperatures. For dyeing machines, scouring bowls, washing machines, and other places where even temperature of a liquid is desired, it has no superior. Automatic. Reliable. Easily installed. Accurate. Try one 30 days. If it doesn't prove a saving, send it back.

1445-B

Insures A Better Quality Product and A Fair Profit



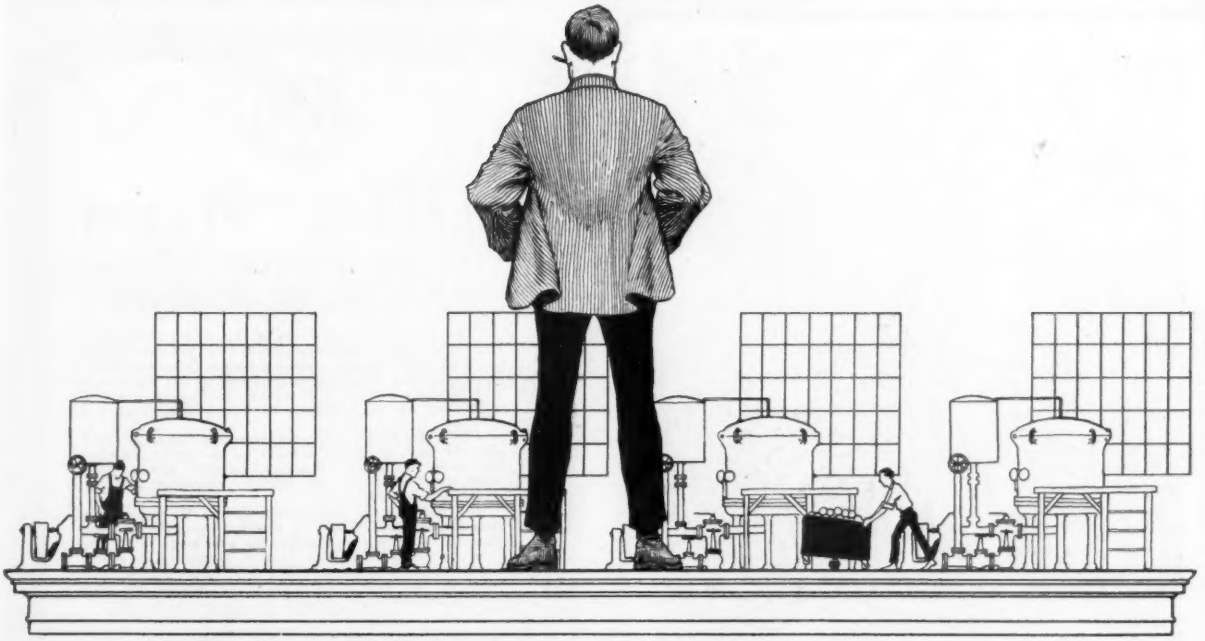
Is it a problem for you to meet growing competition, increased demand for better quality and maintain at the same time a fair margin of profit? If these things are troubling you, the Sargent Dryer can help you solve your problem.

Capable of a large production, operating at a low consumption of steam and power with minimum of attention, thereby saving in labor, they produce at low cost a clean, soft, bright, thoroughly dried and uniform fiber. In addition to wool the Sargent Dryers are made for drying cotton, hair, linters, flax, silk, etc., also carbonizing, bonizing.

Booklet on the Sargent Dryer, or any of our other machines gladly sent on request.

C. G. SARGENT'S SONS CORP.
GRANITEVILLE, MASS.
Fred H. White, Southern Agent, Charlotte, N. C.

Sargent Dryers



What Does FRANKLIN Package Dyeing Mean to the Boss Dyer?

FIRST, it means ability to show startling economies and marked increases of efficiency in his department. It places him in the position of a master craftsman at last supplied with perfect tools.

Second, it simplifies his labor problem, enables him to use less labor, and labor of a kind that is easier to get.

Third, it surrounds him and his assistants with vastly improved physical conditions,—a clean dye house free from enervating steam-laden atmosphere, with its resultant dangerous dampness, for Franklin Dyeing is done inside steamtight kiers.

Franklin Package Dyeing places the "boss dyer" at the head of a department that gets **results,** and that is, withal, a splendid place in which to work, a department that in every way gives him special craft-skill and his general executive ability fullest scope for proving their worth.

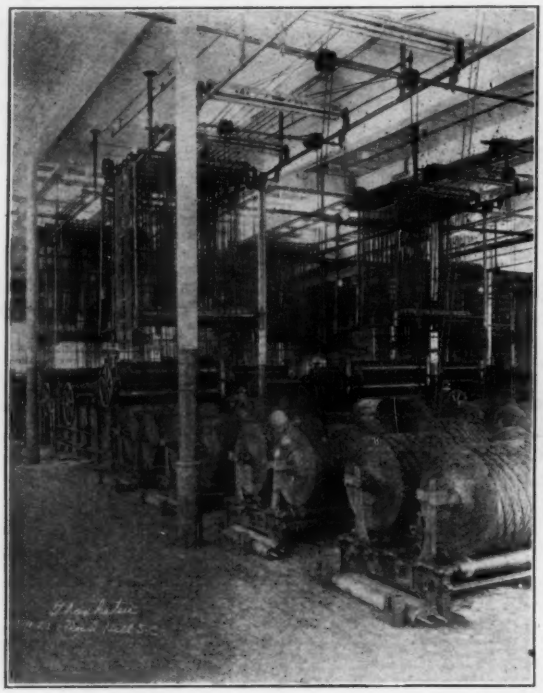
FRANKLIN PROCESS

Philadelphia CO. Manchester, Eng.

Greenville, S. C.

PROVIDENCE, RHODE ISLAND, U.S.A.

Job Dye Houses in All Four Cities



Continuous System Indigo Dyeing Equipment for Warps

In the equipment illustrated fifteen warps are led through a Two Compartment Boiling Out and Cooling Machine, through two Indigo Vats, and taken up by Dye House Ballers in one operation in an initial run.

In a second run the fifteen warps are led through two Indigo Vats, and are taken up by Dye House Ballers.

In a third or finishing run, five of these warps are led through a Two Compartment Wash Box operating in connection with the Dry Cans equipped with a five-unit Coiler.

The successful handling of warps through Continuous Dyeing Systems such as described is only possible through the use of Automatic Tension Controls and Regulators such as we build and use with our Dyeing Equipments.

For further particulars and prices, write or wire

Cocker Machine & Foundry Co.

Gastonia, N. C.

Builders of Warpers, Beamers, Warp Dyeing Machinery

WARPING MACHINERY

Linking Warpers—Linker Heads—Balling Warpers—Balling Attachments—Section Beam Warpers—Special Warpers.

WARP BEAMING MACHINERY

Long Chain Beamers—Short Chain Beamers—Warp Splitters—Special Beaming Machinery.

WARP DYEING MACHINERY

Boiling Out Boxes—Continuous Systems—Sizing Machines—Doubling and Splitting Systems—Sulphur Machines—Indigo Vats—Warp Coilers—Dye House Ballers—Hydro Sulphite Equipment—Warp Bleaching Equipment—Drying Cans.

DURABLE K-W UNIVERSALLY USED

KLAUDER - WELDON DYEING - BLEACHING- SCOURING MACHINERY

There are K-W machines in use which were built nearly half a century ago and which are still doing their work efficiently and economically under severe service. This is sufficient evidence of the durability and capability of K-W Machines after long years of subjection to the ravages of live steam, heat and alkalis.

K-W Machinery by its accomplishments, has steadily and irresistibly built up a reputation that has made the name "Klauder-Weldon" synonymous with the "world's best dyeing, bleaching and finishing machinery."

Our interest in upholding the K-W reputation means that you MUST be satisfied, and our suggestions to prospective purchasers are made with the view toward solving any dyeing, bleaching or scouring problem for all time. We will be glad to answer any and all questions without obligation on your part whatsoever.

Write today for K-W Literature

THE KLAUDER-WELDON DYEING MACHINE CO.

Bethayres, Pa., U. S. A.

H. G. Mayer, Southern Agent,
Realty Bldg., Charlotte, N. C.

DRYING

TEXTILE MATERIALS of all kinds are dried by "Proctor" Dryers—dried much more economically than is otherwise possible.

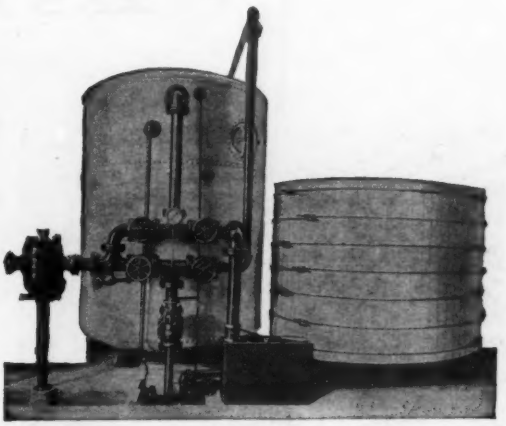
The "Proctor" organization has specialized in drying machinery since 1883—a longer time, on a broader scale, than any other organization. Its vast experience equips it to render invaluable help when you investigate machinery for drying your product—also to give matchless service-value in the "Proctor" Dryer you will be sure to select as the most practical and profitable equipment for your needs.

Write for a catalogue, mentioning the material you wish to dry.

PROCTOR & SCHWARTZ, INC.
formerly The Philadelphia Textile Mach'y Co.
PHILADELPHIA, PA.

"Proctor" DRYERS

How a Mill Reduced Yarn Breakage to Practically Nothing



The name and address of this plant with full details will be given upon request.

A well known textile mill in Millbury, Mass., manufacturing ticking, had considerable trouble with the breakage of yarns in their beaming machines.

The yarn was handled in a warp about 2 inches wide, 2 or 3 strands deep and 10,000 to 12,000 yards long. It was first boiled out in a caustic soda solution and then dyed in a standing bath of indigo, after which it passed over to the beaming machines, where the threads were separated on the reel ready for weaving.

Due to the presence of lime salts in the water supply, a precipitate was formed in the dye bath that deposited on the warp, causing the individual strands to adhere, and when they were run over the beamers the yarn broke repeatedly, necessitating frequent stopping of the machines to tie in.

In November, 1919, they installed Permutit Water Softening Equipment that removes all the hardness (lime and magnesia) from their water supply. A recent report stated,—"Now, we have no trouble at all, and our light yarn which we make 12,000 yards long runs in 3½ hours, where before I have seen it run into the third day, and in lots of cases it has run into two weeks.

The saving in Beaming Room labor alone, amounts to more than $6,000.00 annually (6 girls at $20.00 per week), and the entire investment in Permutit paid for itself in less than one year.

It will pay you to let us investigate your water supply. All analyses are free of charge—write us today.

The Permutit Company
440 Fourth Ave. New York

Filters —— Water Softeners —— Special Apparatus

We manufacture all types of equipment for treating water to render it soft, pure and correct for any purpose. We remove iron, manganese or any other impurity. Let us send you our valuable booklet.

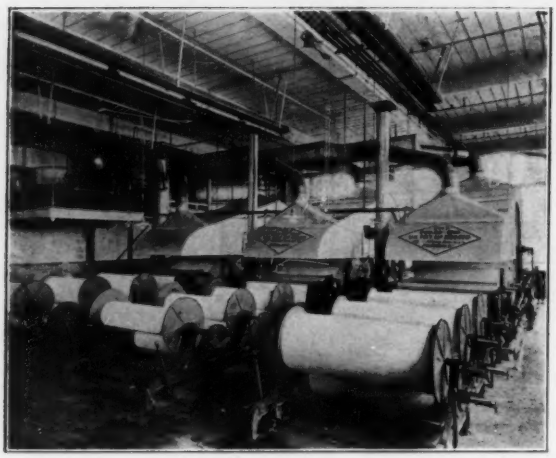
Zeolite Water Softener Patent Sustained

The Federal Court at Buffalo (Hazel J.) on June 15, 1921, handed down a decision sustaining our broad patent covering Zeolite Water Softeners. According to this decision all Zeolite Water Softeners on the market not made by us are an infringement of this patent.

No need to borrow trouble—buy Permutit—it is the best anyway.

HERE'S A BETTER WAY

—to operate your Slasher Room



Portion of Slasher Room, Saxon Mills, Spartanburg, S. C., showing installation R. O. Pickens Slasher Hoods.

The old fashioned method of sizing should have been abolished years ago. If you install

PICKENS SLASHER HOOD

it is unnecessary for you to suffer the loss and inconveniences caused by the old process now employed in your Slasher Room.

PICKENS SLASHER HOOD is constructed in accord with scientific practice and practical experience.

TEN SOUTHERN TEXTILE MILLS are now using them with success—YOU SHOULD DO THE SAME.

WE ARE WAITING TO GIVE YOU A DEMONSTRATION.

R. O. PICKENS SLASHER HOOD COMPANY

SPARTANBURG, S. C.

Established 1815

ARNOLD HOFFMAN & CO., Inc.

Providence New York Boston Philadelphia Charlotte

Oldest in Years. Youngest in Spirit
Modern in Ideas. Progressive in Methods
"Service" Our Motto

All kinds of
Warp Dressings, Finishing Materials, Soaps, Soluble Oils, Etc.

Please Submit Your Problems to Us

Maintaining Uniform High Quality

The reason that Mathieson Chemicals are recognized the highest standard of quality is that each step in their manufacture, from the raw material to the finished product is under the constant observation of chemical engineers and each step is tested carefully for purity and uniformity.

You will never make a mistake when specifying Mathieson in ordering any of the following:

LIQUID CHLORINE: 100% Pure Anhydrous, shipped in 105, 150 and 2,000 pound containers. Used in practically every bleaching operation where bleaching powder is used.

BLEACHING POWDER: The highest test and most stable bleach manufactured. Shipped in 225 lb., 300 lb., 450 lb., and 750 lb. steel drums. Special drums for export; wooden lined, containing 400 lbs.

SODA ASH: 58% Pure Alkali, both light and dense Shipments in bulk, bags and barrels.

CAUSTIC SODA. 60, 70, 74, 76% Fused—Ground—Flaked. 78% Solid—99½% Pure—Castner Electrolytic Process. Shipments of Solid in steel drums; Ground and Flaked in barrels and drums.

VIRGINIA SODA: (Sesquicarbonate of Soda) A beautiful white crystalline neutral soda, uniform in character and action. The finest neutral textile soda for scouring and washing. Shipment in barrels and bags.

BICARBONATE OF SODA: Purest grade, powdered or granular. Shipments in bags, barrels, kegs and cases.

CHLORINE SOLVENTS: Tetrachlorethane Ethylene, Chloride and others.

If you have a problem to solve, our Technical Service Department is at your service without obligation.

Shipments made from centrally located stocks located in different parts of the South. Write, wire or phone our Southern Office at Charlotte. Demonstrator gladly sent to your mill on request.

THE MATHIESON, ALKALI WORKS, (Inc.)

Executive Offices: 25 West 43rd St., New York City

Mathieson Chemicals

EAGLE-THISTLE BRAND

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Works:
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Leaves No Argument as to When

"BLACK IS BLACK"

WHY BE SATISFIED

with a RUSTY BLACK when you can have a RICH LUSTROUS BLACK by finishing your Hosiery with the latest, most efficient and satisfying patented preparation

"DEVELOPENE"

A Demonstration Will Convince You

Send us a pair of unfinished stockings, skein of yarn or a piece of fabric—cotton, silk, artificial silk, wool or mixes—which has been dyed black, washed but not finished. We will finish it with "DEVELOPENE" and return to you.

There will be such an improvement that you will immediately want "DEVELOPENE" for finishing your goods.

No further softener—or soap—required. Makes hosiery slip on and off the board easily—leaves the product soft and pliable.

Manufactured Only by the

KALI MFG. CO.

1404-1410 North Front St.

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Sole Manufacturers of

Hydroxy Oil and Sodium Sulphide Single and Double Strength Kali Chlorine Neutralizer

ALUMINUM ACETATE FOR OXIDIZED BLACK DYEING

Save Repainting Costs

Mill white painted surfaces can be easily washed and made to look bright, fresh and clean by the use of

WYANDOTTE DETERGENT

Not only can they be washed once, but many times thus renewing their appearance again and again.

Washing with Wyandotte Detergent not only saves the cost of repainting, but it also saves the annoyance and inconvenience which repainting always incurs. Why not ask your supply man to send you this useful washing product with the understanding it will satisfy or cost you nothing?

Indian in diamond

in every package.

The J. B. Ford Co., Sole Mnfrs.,
Wyandotte, Mich.

Stauss 68% Soluble Tallow and Gum—Soluble Oils

for all warp sizing and finishing purposes.

None better.

Manufactured by Geo. P. Stauss,

Importers and Distributors of

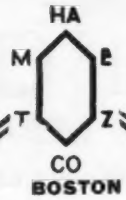
Starches, Softeners, Weighting Compounds

Write, phone or wire

Southern Distributing Company

Manuel Faulkner, Sales Mgr.

50 Market St., Phone 3439 Charleston, S. C.



Tell the Truth!

AMERICAN Chemists and Manufacturers are entirely competent to shape their own destiny if afforded proper support and encouragement, without building a "Chinese wall" around themselves.

Why becloud the issues and delude the public with threadbare "war-talk" and similar "bunk"?

Straight-thinking Americans are not afraid of "ghosts" no matter from what country they come.

Embargoes and Licenses simply handicap the American consumer. Ample protection for the Dyestuff Industry can be effected by tariff rates.

Our aim is to assist, not handicap, the American consumer. Therefore, we are opposed to Embargoes or Licenses and in favor of adequate tariff protection.

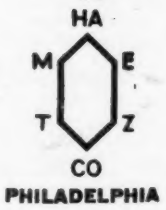
Aside from the products made in the U. S. by

CONSOLIDATED COLOR & CHEMICAL CO.

and

CENTRAL DYESTUFF & CHEMICAL CO.

we can also procure for you vat and other colors on licenses at lowest prices quoted for export by the European manufacturers.



H. A. METZ & CO. Inc.

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Boston Philadelphia Providence Chicago Charlotte San Francisco

The Grasselli Chemical Co.

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Works at:

GRASSELLI, N. J. ALBANY, N. Y.

SULPHUR COLORS: Black, Blue, Brown, Green.
Direct Cotton Colors, Acid and Chrome Colors
MONOPOLE BRILLIANT OIL
Bichromate of Soda Sodium Sulphide
Zinc Dust, Chemicals and Acids

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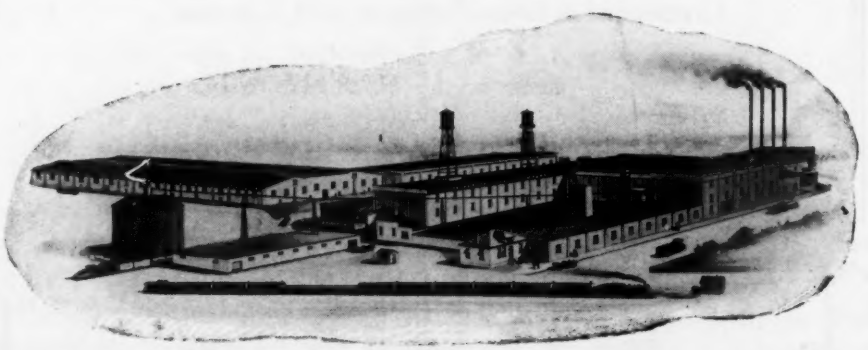

VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

Staley's

Staley's Eclipse Thin Boiling Starch will eliminate most of your "seconds" and prevent much of the shedding under your looms. Instead of just coating the outside, Staley's Eclipse penetrates and saturates every fibre of the yarn. It gives your yarn ten to fifteen per cent greater breaking strength without impairing its smooth, soft-feeling quality. Satisfactory results assured with all numbers of cotton warp yarns. Every granule of every bag absolutely uniform.

Staley's Pearl Starch

is our standard product for textile mill use and is strongly recommended for all sizing work requiring less binding power than is secured with Eclipse Thin Boiling Starch.

Each Staley Starch is specially processed for the particular work it is to perform. There is a Staley Starch that will meet your requirements exactly. Send for samples and prices.

A. E. Staley Manufacturing Co.
DECATUR, ILLINOIS.

Southern Representatives
G. A. Dean,
c/o Finch Hotel
Spartanburg, S. C.
J. W. Pope,
c/o Ansley Hotel
Atlanta, Georgia.

New England Office
A. E. Staley Mfg. Co.
88 Broad St.,
Boston, Mass.

Starch

"BRETON" MINEROL "F"

For

Cotton Yarns

"It stays on the yarn."

BORNE, SCRYMSER CO.

Established 1874

80 South Street, NEW YORK

BOSTON **PHILADELPHIA**

Works: Elizabethport, N. J.

AN OPEN LETTER ON COTTON WARP SIZING

Mr. Cotton Mill Executive:

An authority on the chemistry of practice and cotton warp sizing states: Many cotton manufacturers would be astonished at the amount of saving that could be effected in their sizing process if they could only be persuaded that positive results could be obtained on a more efficient basis, at a very much lower cost, with modern highly standardized commodities.

Our Textile Laboratory, cognizant of the vital importance of the primary treatment of the cotton warp and its relation to the subsequent processes, has, in no small degree, demonstrated the truth of the foregoing statement in New England and Southern cotton mills during the past decade.

AMALOL and GLUANTINE are displacing older methods wherever used and invariably show an appreciable saving from start to finish. Let us prove to you the ready adaptability of AMALOL and GLUANTINE in your plant, and moreover, do not fail to read the interesting literature that has recently been sent you.

We will gladly ship you on approval a barrel each, and furnish correct formula for your individual requirements.

List of users gladly furnished.

L. SONNEBORN SONS, INC.
Textile Products Division
262 Pearl Street, New York City

Ciba Company, Inc.

Cedar and Washington Streets, New York

SOLE REPRESENTATIVES IN THE UNITED STATES OF THE

SOCIETY OF CHEMICAL INDUSTRY IN BASLE, SWITZERLAND

Special attention is called to our full line of

CHLORANTINE COLORS

Fast to Light and Washing Direct Colors. They dye silk and cotton the same shade and discharge to a perfect white

SAMPLES AND QUOTATIONS ON APPLICATION

BRANCHES:

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B. & L.

Anti-Chlorine Bleaching Process

FOR COTTON

Simple
Scientific
Safe

BOSSON & LANE
Works and Office, Atlantic, Mass.

JACQUES WOLF & CO.

Manufacturing Chemists and Importers

PASSAIC, N. J.

ALL SIZING AND FINISHING PRODUCTS
For Cotton

HYDROSULPHITE
For stripping and discharge printing

INDIGOLITE
For indigo discharge.

BENSAPOL
BLEACHING OIL
CREAM SOFTENERS
GLASGOW SIZE
LEVULINE
LUSTROSE
SOLUBLE OILS
WHITE FINISH
MONOPOLE OIL
Reg. Trade Mark No. 70991.

Starch

EAGLE ★★★
EAGLE ★★
EAGLE ★
EAGLE ★★★★

The experience of critical operators has shown this popular brand to be the most efficient sizing agent, both for additional WEIGHT and increased STRENGTH of WARP. Penetration accomplishes these important results.

EAGLE STARCH is specially manufactured to cover a wide range of fluidities to meet the needs of all classes of weaves.

EAGLE STARCH penetrates.

Corn Products Refining Co.

New York

Southern Office *Greenville, S. C.*

Starch

FIG.20.

All our baskets made from Lane Duck of our own weaving. Unusually high tensile strength and wearing qualities are obtained by use of strictly long staple cotton and approved modern methods of manufacture.

STANDARDIZE
on
LANE CANVAS BASKETS

Their Long Life makes them an investment

FIG.27

This truck embodies all the advantages of Lane Baskets, plus our specially designed Thread Guard Casters, which are NON-CLOGGING. Furnished in either stationery or swivel frame style, of generous diameter and tread.

Write for Catalog No. 75

W. T. LANE & BROTHERS, Manufacturers, Poughkeepsie, N. Y.

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HEADQUARTERS OF RAW MATERIALS for the TEXTILE INDUSTRY

Carbonate of Soda — Caustic Potash
Chloride of Lime — Caustic Soda
Aniline Oil — Aniline Salt
Gum Tragacanth — French Talc
Gum Arabic — Glycerine
Gum Karaya — Verdigris
Olive Oil Commercial
Imported Zinc Oxide

Inquiries Solicited

A. KLIPSTEIN & CO.

644 Greenwich Street, New York City

AKO AKO AKO

HARRIS

Steel Clad Broom

The Best Broom in the Market
The Cheapest Broom in the Market
Will You Profit by Using It?

The Factory Broom Universal

Order a Sample Package on Approval

PRICE LIST

24 LB. MILL BROOM $3.75 PER DOZ.
32 LB. FACTORY BROOM $3.75 PER DOZ.

PATENTED

All Broom Corn or Filled with Bamboo
F. O. B. CHICAGO

GUARANTEE:

We will guarantee this broom to be the equal or better than any broom on the market and sold subject to your approval.

Wire or mail your order.

THE HARRIS BROOM COMPANY

321 E. Grand Ave. CHICAGO

FIG. 2. LESTERSHIRE FIBRE HEAD SPOOL

"LESTERSHIRE" Vulcanized Fibre Head Spools

Lestershire Fibre Head Spooler and Twister Spools are the most economical Spools in use today. They will last longer, give better service and increase your production.

Write for details as to how these Spools will save you more than their original cost in the first six months' use.

Lestershire Spool & Manufacturing Co.

Johnson City, N. Y.

Spool heads that will not break, splinter nor roughen, with dogwood or fibre spindle bearings.

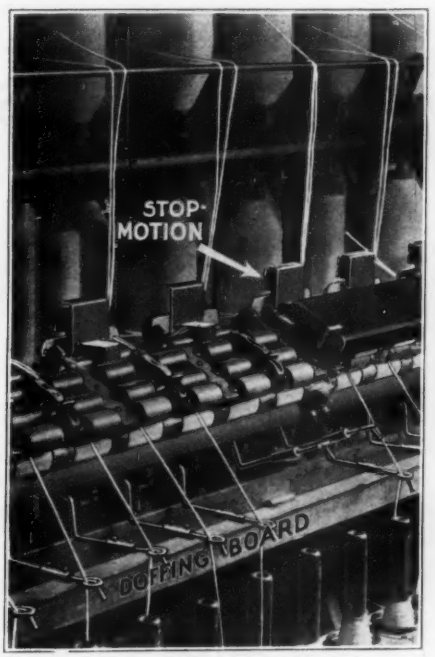
AUTOMATIC STOP-MOTION DEVICE FOR Spinning and Twisting

At the Boston Textile Exposition the Eclipse Automatic Stop-Motion was conceded to be one of the outstanding improvements of the Industry. The Eclipse Automatic Stop-Motion may be equipped to any make of spinning frame.

It Prevents Waste, Saves Rolls and Increases Operatives' Efficiency

Let us tell you more about this new profit saving device.

Write us today.

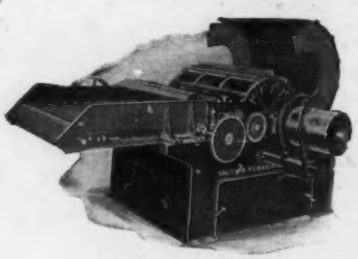


ECLIPSE **Eclipse Textile Devices, Inc.** ECLIPSE

Elmira, N. Y.

SMITH & FURBUSH
MACHINE CO.
PHILADELPHIA, PENNA.

Specialists in machinery for working all kinds of Waste Products. Complete equipment for coarse yarns, etc., from waste. Shoddy, Felting and Woolen machinery.

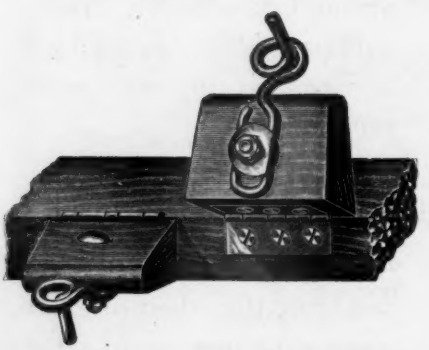


Jute Picker
Send for Circular S-166

This machine is used for shredding or hackling out Gunny and Burlap bagging.

It is used as a part of our outfit for the manufacture of gunny sacking from scrap bagging.

The Palmer Adjustible Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

"Clean Floors Reflect Clean Business"

300 Great Textile Mills Maintain CLEAN FLOORS with the FINNELL SYSTEM OF POWER SCRUBBING!

Textile Show Starts Many More

The opportunity presented at the International Textile Show in Boston the week of October 31, to greet old friends and meet new ones, was appreciated.

Many users of Finnell Floor Scrubbing equipment visited our exhibit. An indication of THEIR approval of the machinery was shown by purchases of additional equipment for Auxiliary Mills. Non-users were eager for information on Systems for their mills.

Write our General Offices for facts covering the experience of present users. Expert advice will be furnished on Floor Scrubbing Equipment for YOUR mill, without obligation.

Yours for CLEAN FLOORS

American Scrubbing Equipment Co.

Manufacturers of Finola Scouring Powder

General Offices and Factories: 1229 Collier St., Hannibal, Mo.

DISTRICT OFFICES:

ATLANTA	DENVER	NEW ORLEANS
BALTIMORE	DETROIT	NEW YORK
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CHICAGO	MILWAUKEE	ST. LOUIS
CLEVELAND	MINNEAPOLIS	SALT LAKE CITY
	NEWARK	SAN FRANCISCO

"Clean Floors Reflect Clean Business"

A WISH

At the close of the Old and the beginning of the New Year, each of us attempt a forecast of the year ahead.

The year we are leaving behind has been one of re-adjustment. Each line of industry having its own individual problems to solve. These problems have been met fearlessly and courageously, until today, as we stand on the threshold of a New Year there has been generated a feeling of stability and confidence in the future.

The year just closing has been a most successful one for us. 1922 holds out most flattering prospects.

We wish to thank our Customers, Friends and the Textile Industry for their unstinted patronage of the past.

It is our Earnest and Sincere Wish that Each and Everyone enjoy to the Fullest A Bounteous and Successful NEW YEAR.

Atlanta Brush Co.

Successors to

D. D. Felton Brush Company

Central and Trinity Aves.

ATLANTA, GA.

INCREASE in cloth production for a solid year's run can be shown with

"DUPLEX"

FLAT STEEL LOOM HARNESS

STEEL HEDDLE MFG. CO.

GREENVILLE PHILADELPHIA PROVIDENCE

Southern Office

111 Washington St. :: Greenville, S. C.

Hampton Smith, Southern Manager.

N. B.—We are the sole manufacturers of Nickle-Plated Drop Wires for every kind of loom.

SHAMBOW SHUTTLES

We recommend Fire Re-inforced for longer service—better weaving.

BROWN & SHARPE

Milling Machine—Automatic Gear Cutting Machines and Machinists' tools. There are none better.

HENDEY

Lathes, Shapers.
Two tools that you should have in your machine shop. Recognized everywhere as the best to be had.

When in the market for Textile Supplies, or Machine Shop Equipment, let us quote you on your requirements. We represent the leading manufacturers, and you will find our service unsurpassed.

THE WALRAVEN CO.

Machinery and Mill Supplies

36-38 W. ALABAMA ST. ATLANTA, GA.

AMERICAN SUPPLY COMPANY

PROVIDENCE, R. I.

MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping
Etc.

We make a specialty of Harness for Warp Drawing Machines

NOTE—No orders too large for our capacity. None too small to receive careful attention.

Pat. Applied for

SPUR-CAP SHELLS

Made to Stand the Hard Knocks

MANUFACTURED BY

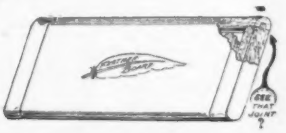
GALLAUDET AIRCRAFT CORP'N.,

EAST GREENWICH, R. I.

FEATHERBOARD

The Master Cloth Reel

LIGHT AND STRONG. IMPROVES YOUR PUT UP.



PRINTING

FAIR PRICES AND PROMPT SERVICE

Numbered among our most satisfied customers are some of the largest mills in the South, for whom we print time cards, time sheets, and their various printed and special ruled forms

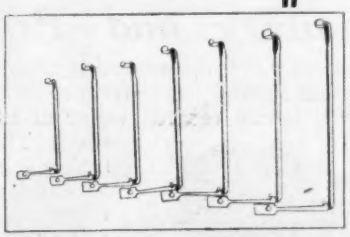
Our plant is one of the largest and most completely equipped printing plants in the South. Our long experience enables us to produce the most perfect printing and service, and our large volume and purchasing power enable us to save you money on your printing.

Just as we please our other textile mill customers, so we can please you. Let us quote prices on your next printing order.

The A. J. SHOWALTER *Company*

DALTON, GEORGIA.

THE BEST



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are made by

Southern Spindle & Flyer Company

Of Norway Iron. Perfectly Fitted before leaving our factory.

WE MANUFACTURE

Repair, Overhaul all kinds of Textile Machinery, Align and Level Shafting by the Kinkead System.

Our 20 Years of Experience is at your command.

HOW ABOUT OUR NEW CATALOG? WANT ONE?

Southern Spindle & Flyer Company

Charlotte, N. C.

W. H. MONTY, President

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BOSTON HANK CLOCKS

The Recognized Standard for Accuracy and Durability

Many thousands in use.

Lasts many years.

All parts interchangeable.

Prompt delivery.

Special clocks to order.

Write us your requirements.

Our experience is at your command.

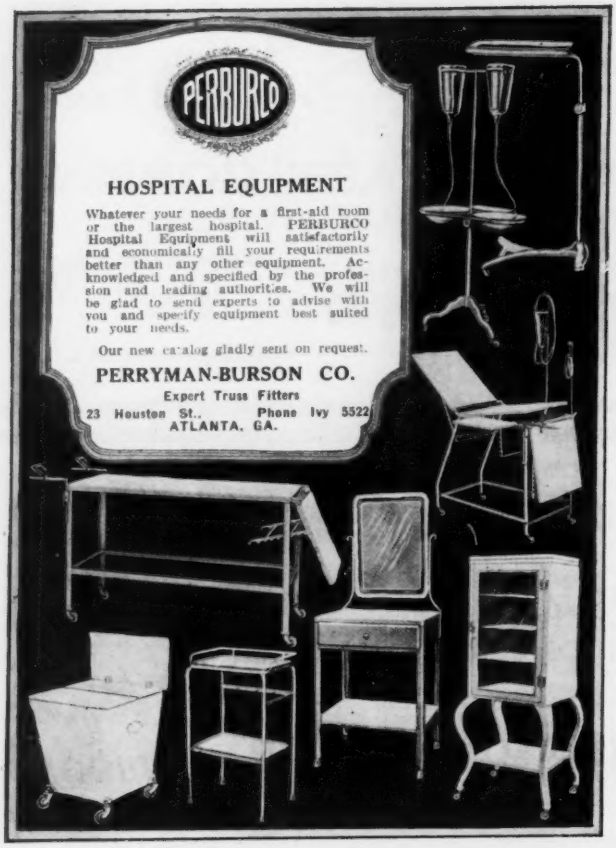
Boston Clocks tell just what the production from each frame actually is

BOSTON MACHINE WORKS CO.

LYNN, MASS. U.S.A.

Offices at

Cincinnati, Ohio. Milwaukee, Wis. St. Louis, Mo.


PERBURCo
HOSPITAL EQUIPMENT
Whatever your needs for a first-aid room or the largest hospital. PERBURCO Hospital Equipment will satisfactorily and economically fill your requirements better than any other equipment. Acknowledged and specified by the profession and leading authorities. We will be glad to send experts to advise with you and specify equipment best suited to your needs.
Our new catalog gladly sent on request.
PERRYMAN-BURSON CO.
Expert Truss Fitters
23 Houston St., Phone Ivy 5522
ATLANTA, GA.

The Only Really Sanitary Fountain

Lips cannot touch nozzle.

Glass or cup can be filled from this stream.

Greatly reduced pressure automatically puts this fountain out of use before it can become a menace to health.

Prevents squirting, tampering and pilfering.

The angle of the "Vertico Slant" is just enough to make it a self-cleaning stream and still leave the copious drinking feature of the vertical stream.

Write for circular giving greater details and showing the various styles of fountains and cooler fountains.

RUNDLE-SPENCE MFG. COMPANY, MILWAUKEE, WIS.

R-S VERTICO - SLANT STREAM FOUNTAINS

Save time distributing papers

Kleradesk

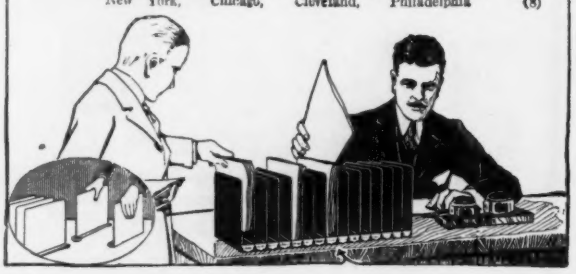
Automatically sorts and routes mail, memos, orders, etc., for all to whom mail is distributed. It holds reference papers immediately at hand when needed. Very convenient.

A Steel Sectional Device

Add compartments as required. Sections $1.20 each. Fifteen-compartment Kleradesk illustrated below only $19.20. Indexed front and back. Write for free, instructive folder, **"How to Get Greater Desk Efficiency."**

Ross-Gould Co., 318 N. 10th—St. Louis

New York, Chicago, Cleveland, Philadelphia (8)

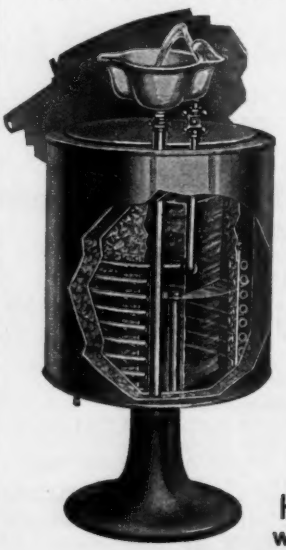


Puritan CANTONMENT DRINKING FOUNTAINS

Sanitary and Practical

Practical drinking mound is formed by mechanical means. Interference is set up in stream which retards water at the apex of arc. This stream makes it impractical to drink from any other point, thus insuring perfect sanitation.

Approved by the U. S. Government. Now recognized by largest interests and schools in the country.



Puritan "Cantonment" Coolers are designed to connect with pressure lines and are so constructed that the drinking water does not come in direct contact with either the ice or ice water, but is circulated through brass coil which is tinned both inside and outside.

Write today for illustrated literature.

Halsey W. Taylor Company

Warren, :: :: :: Ohio

OUR BLANK BOOK DEPARTMENT

Has one order which requires over eight tons of paper, and this department consists of only a small part of our

Complete and Modern Equipment

Our entire equipment and force of specialists, each one an expert in his line, is at your service for the production of anything that it is possible to produce with

Type, Ink and Paper

OUR PLAN SAVES YOU MONEY ON ALL YOUR PRINTING

Let us tell you about it.

BYRD PRINTING CO.

Established 1887

BYRD BLDG. ATLANTA, GA.

Sanitary Wash Bowls

One Type of Our Bowls.

Our Line of Sanitary Equipment Includes:

Sanitary Wash Bowls (in batteries), Bubbling Fountains (plain and ice cooled), Metal Lockers, Metal Stock and Pattern Storage Racks, Metal Shelving, Metal Cabinets, Vault Fixtures, Soda Kettles (40 and 60 gallons), Metal Stools and Chairs, Water Mixers, Work Benches, Bench Legs, Full Line of Plumbing Fixtures, etc.

Send for Complete Catalog.

Manufacturing Equipment & Engineering Co.

136 FEDERAL STREET, BOSTON, MASS.

Works and Mail Address: Framingham, Mass.

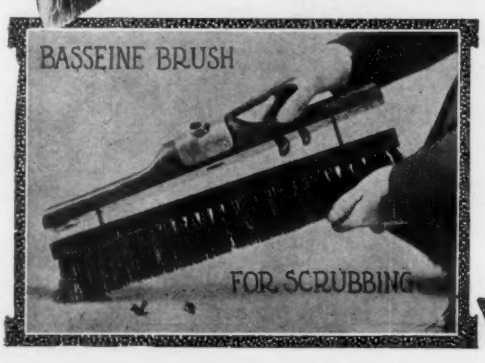
FIBRE BRUSH FOR SWEEPING

A Clean Mill To Work In

Means contented workmen, and contented workmen means better work and more of it. Coincident with the wave of receding wages that is sweeping over the land far-seeing employers are taking heed of the little things that go far toward making their employees contented and not the least of these is to keep the working place clean and inviting.

The "Two-in-One" Combination Sweep and Scrubbing Brush fits into the new requirements of the times because it is made to lessen toil and do effective work at the same time. Its use in any mill or workshop means absolute cleanliness, a big saving in labor cost, and minimum outlay in replacement. Write for catalogue and price list of brooms and brushes of all kinds.

SOUTHERN BRUSH AND BROOM COMPANY.



601 Citizens & Southern Bank Bldg., Atlanta, Ga.

THE

"Southwestern Iron Clad"

Is the IDEAL Cotton Mill Broom

Only the best grade of broom corn is used in these brooms—they are built strong and will withstand the hardest usage.

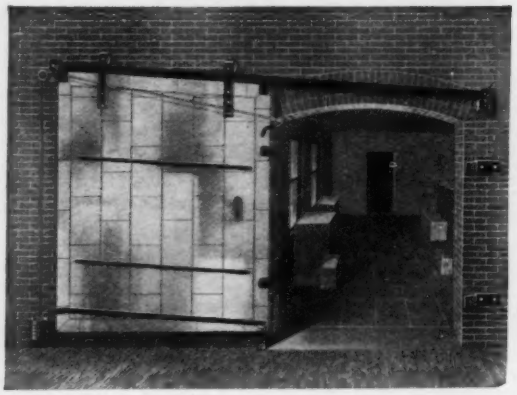
The light weight, yet strong and substantial shields used gives the broom ample protection and at the same time allows the proper amount of of broom corn to be used, thus giving them excellent sweeping qualities.

MADE RIGHT! PRICED RIGHT!

Inquiries and orders receive prompt attention.
Sold direct and through
all principal distributors.

The Southwestern Broom Mfg. Co.

Evansville, Indiana



A fire starting on either side of the door pictured above must stay on that side. Insure your plant against heavy fire loss by equipping it throughout with our R-W fire doors.

REMEMBER

it pays to be on the safe side.

Richards-Wilcox

Fire Door Protection

In spite of the utmost precaution fires will sometimes start. The important thing is to stop them before any considerable damage is done. By equipping your plant with Richards-Wilcox fire doors you are going a long way toward the prevention of a disastrous and costly fire. Every R-W installation is especially designed to fit the exact needs of the user. Tell us of the conditions which exist in your plant and our engineers will give you the benefit of their knowledge in fire prevention.

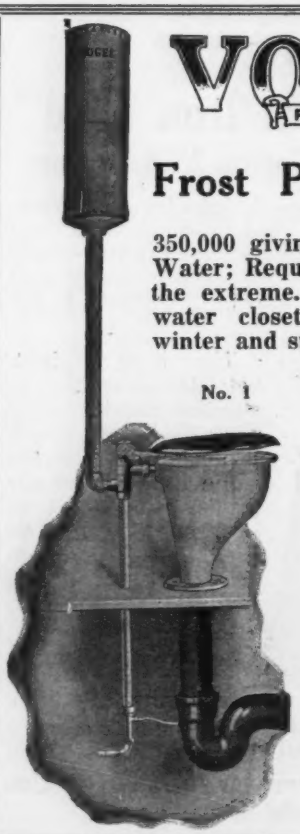
Write today for our latest Catalogue G-16.

Richards-Wilcox Mfg. Co.
"A Hanger for any Door that Slides"
AURORA, ILLINOIS, U.S.A.
CHICAGO BOSTON
ST. LOUIS NEW YORK
LOS ANGELES CLEVELAND INDIANAPOLIS MINNEAPOLIS
PHILADELPHIA LONDON, ONT. SAN FRANCISCO

VOGEL
PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.



No. 1

- Enameled Roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat.
- Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE

Maintain The Efficiency of Workmen by Cool, Pure Water

Bottled water and paper cups run into a lot of money but here's how you save all this and get the best results

Twentieth Century Sanitary Ice-Cooled Bubbling Fountains

are for attachment to city water supply and they supply ice-cooled water which is much more sanitary than "ice-water."

They hold 75 pounds of ice—will supply 50 to 75 people. Self-cleaning, do not harbor germs, use less ice than ordinary water coolers—are durable in construction and attractive in looks.

Our Bubbler Heads are absolutely non-squirting and give forth a steady, easily-regulated stream.

Send for complete catalog and prices.

Twentieth Century Brass Works
Belleville, Ill.

Price ?

Sanymetal
TOILET PARTITIONS
TRADE MARK U. S. REG.

Win on that Score Too

TIME was when wooden toilet partitions were so much cheaper and more attractive than metal that the latter stood little chance in competition. Time was when marble was considered the only proper material for a really high-grade partition.

Now, at a cost about the same as wood, Sanymetal can be installed—with a perfection of design superior to wood, a durability that wood never could possess, and a sanitary quality that defies comparison. And Sanymetal has attained such a beauty of line and finish in every detail, that it is widely replacing marble in the finest types of installations, at a fraction of the cost of marble.

In selecting toilet partitions for your mill or offices, you can't possibly show truer economy than by choosing Sanymetal. For price is one of its plainest advantages.

Let us tell you more about it.

THE SANYMETAL PRODUCTS CO.
980 E. 64th St, Cleveland, O.

Sanymetal Toilets in the factory of the A. O. Smith Corp., Milwaukee, Wis. Herman J. Esser, Arch.

Pioneer with the Pioneer

—and be the first to reach the goal

The textile industry, as a whole, has been among the first to emerge from the passing era of business depression. Trade conditions, together with efficient engineering and management, have all contributed to this condition.

Now, new problems of management must be solved. New operating conditions must be met. New standards of production must be established to meet new methods of merchandising.

And under these new conditions Lockwood-Greene experience and Lockwood-Greene service assume a new importance.

Lockwood, Greene & Co. have been meeting "new" conditions for nearly ninety years. They are meeting new conditions today.

Questions of finance, questions of management, questions of production, business problems, building problems, engineering problems—all are being met, solved, and answered.

Lockwood-Greene service is a flexible thing ready to be applied to many calls, differing widely in their requirements.

In meeting and solving the problems of today—and tomorrow, the experience and service of Lockwood, Greene & Co. are at *your* call.

Take advantage of them. Pioneer with the pioneer—and be the first to reach the goal.

LOCKWOOD GREENE

BUILDING WITH FORESIGHT

LOCKWOOD, GREENE & CO.
ENGINEERS

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BOSTON ATLANTA CHICAGO NEW YORK
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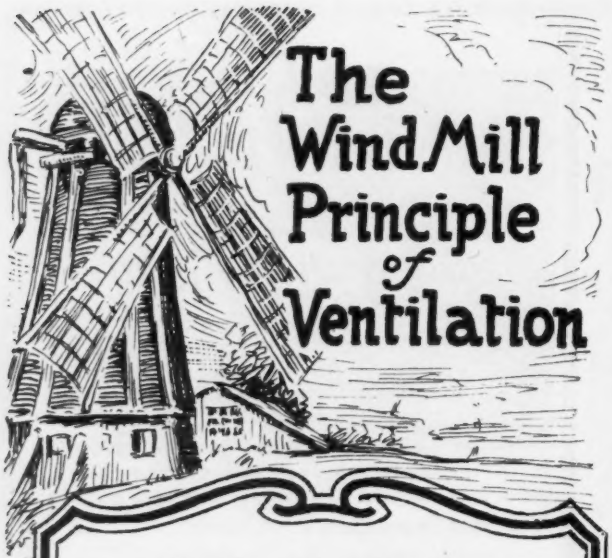
SANTIAGO, CHILE

LOCKWOOD, GREENE & CO. OF CANADA, LIMITED, MONTREAL
COMPAGNIE LOCKWOOD GREENE, PARIS, FRANCE

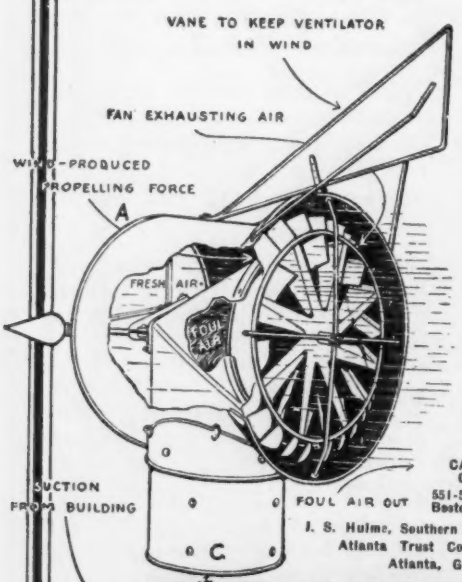


The Wind Mill Principle of Ventilation

Perfect Ventilation With No Expense for Power

THIS patented method of ventilation has proved far more efficient than any other on the market. Tests have shown that the Carlisle displaces from four to six times as much air as ordinary ventilators.

Free air is the power that operates the Carlisle Force Draft Ventilator. The air passing through the funnel comes in contact with the smaller outer blades, thereby propelling the wheel to which the large inner blades are attached. These revolving inner blades create a powerful suction which draws the foul air from below.



A continual supply of pure, fresh air is furnished and maintains the efficiency of your operatives throughout the entire day.

Fewer smaller sized Carlisles will do more work than your present ventilators, and insure positive and CONSTANT ventilation. They are durable, storm proof, trouble-proof. Write for folder.

CARLISLE & GALE CO.
551-577 Albany St.
Boston (18) Mass.

J. S. Hulme, Southern Representative,
Atlanta Trust Co., Bldg.,
Atlanta, Ga.

CARLISLE Force Draft Ventilators

LIDSEEN TEXTILE OILER

A Few drops at a Time

Prevents Spoiling Material

Your Jobber can tell you the story or ask Mr. J. S. Hulme
Atlanta Trust Building, ATLANTA, GA.
who is our Southern Representative.

LIDSEEN PRODUCTS

832-840 So. Central Ave., CHICAGO.
Also Mfrs. of the Lidseen Positive Force Feed Oilers

Uniform Heating

is accomplished by removing the cold air from the floor line and replacing it by the warmer air that naturally tends to go towards the ceiling.

Bayley B.T.U.

distributes heat evenly by means of an electrically driven fan, installed under a series of tempering coils. The fan forces air through the coils and keeps up a constant circulation of tempered air throughout the room. It is made of iron and steel throughout, requires no distribution ducts; no holes through fire walls or partitions, can be installed anywhere by simply setting on the floor and connecting steam and return piping and wiring to motor. Easily moved from one location to another.

Send for B. T. U. Bulletin today.

Dept. I, Bayley Mfg. Co.

732 Greenbush St. Milwaukee, Wis.

Get the Most Daylight for Your Money

THREE outstanding features make Dixielite the leading finish for walls and ceilings of mills, factories, and warehouses.

First, Dixielite is white. Not a near-white, but a pure, bright white that distributes evenly, every ray of daylight to the furthest and darkest corners.

Second, age does not dim its lustre. Time cannot turn it yellow. It is washable. Soap and water keep it brilliantly new.

Third, Dixielite wears longer. It dries with a hard finish that will not chip, crack or peel. Figured over a span of years, Dixielite is really the cheapest.

It is the perfect white finish for walls and ceilings—a product with over seventy years of experience back of it. And it is made by one of the oldest paint and varnish makers in the country. Write today for Booklet No. 51.

WADSWORTH, HOWLAND & CO., Inc.
Paint and Varnish Makers
Boston, Mass.

New York Office Architects Bldg.
Philadelphia Office 1524 Chestnut Street

DIXIELITE

NON-FLUID OIL

CAUTION!

Owing to the SUCCESS of

NON-FLUID OIL

many imitations are being offered—*claiming* lubricating qualities similar to NON-FLUID OIL.

Avoid Substitutes for NON-FLUID OIL Made with PROMISES and a PAINT BRUSH

Get the genuine

TRADE MARK NON-FLUID OIL REGISTERED IN UNITED STATES PATENT OFFICE

Modern Textile Lubricants

The product of 25 years' hard work and actual use.

NON-FLUID OIL has all the lubricating quality of the finest liquid oil, but will not waste—will not drip, spatter or creep—keeps in the bearing and off the cotton—and lasts so much longer that it actually costs less per month for better lubrication.

Just fill out the coupon and mail and we'll send the sample—it's ready.

Ample Stocks at Our Branches

CHARLOTTE, N. C. ATLANTA, GA.
NEW ORLEANS, LA. GREENVILLE, S. C.

New York & New Jersey Lubricant Co.

401 Broadway New York N. Y.

N. Y. & N. J. Lubricant Co.
Please send Testing Samples and Bulletin on "Lubrication of Textile Machinery" to

Name .....

Address .....

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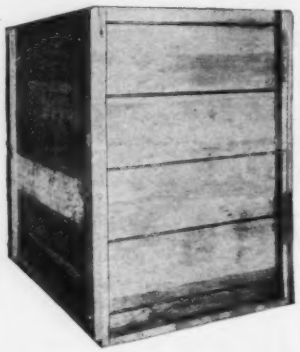


Cypress Tanks
Wooden Packing Cases
ALL STYLES

Manufactured from

GEORGIA PINE POPLAR CYPRESS
WHITE PINE and GUM

Your Inquiry Solicited

Hightower Box & Tank Co.
Corner Humphreys and Glenn Streets,
BOX 1025 ATLANTA, GA.

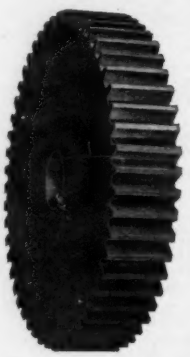
EVENER LAPS MAKE EVENER WORK

The bearing friction of apron and evener rolls causes the evener belt to slip. This makes a thin place in the lap.

Put ball bearings on the evener and apron rolls and eliminate the friction that causes belts to slip, and you will get a much more uniform lap.

The installation is simple, and the cost slight.

AldricH MachinE
Ball **WorkS** Bearings
Greenwood, S. C.



Waterproof Silent Gears

Replace noise with silent operation. Remove the clanging din of grinding gears. Get better working conditions, increased production and lower cost of operation.

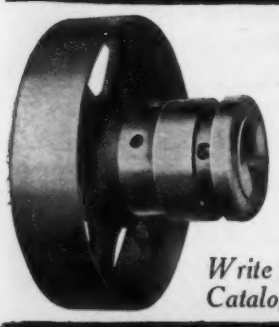
CONDENSITE
CELORON
SILENT GEARS

will give you services in places and under conditions that once were prohibitive to the average silent gear. This remarkable non-metallic, self-supporting material will not warp, shrink or swell. It is waterproof, chemically inert, insoluble and infusible—extremely high in dielectric strength and requires no shrouds or end plates. Give Condensite Celeron Gears a trial.

We do not cut gears but—we will be glad to give you the names of experienced gear cutters near you who can supply Condensite Celeron gears and pinions. Get all the facts. Write us today.

Diamond State Fibre Company
Bridgeport (near Philadelphia), Pa.

THE JOHNSON FRICTION CLUTCH



Write for our Catalog G.

FRICTION CONTROL MEANS BETTER MACHINERY

And we specialize in applying the proper type of friction clutch to meet any conditions.

In the textile plant, the highest efficiency in power transmission lies in the group drive from lineshaft with Johnson Clutch Control. Eliminate your inefficient countershafts and expensive individual motors.

Adopt the Johnson Lineshaft Drive

Johnson Clutches are available from stock in standard sizes, single and double, to fit all shaft and pulley dimensions.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

Never Slips or Stretches Like Leather

Fabreeka Belting

never slips even when wet, giving a pulley contact impossible with leather. It is very pliable and remains so, requiring no dressing of any kind. Impossible to side stretch it.

"Fabreeka" runs smoothly and noiselessly and absolutely true on pulleys. No flapping or vibrating. The only belting that sustains the desired pressure on air compressors. For high speed it is in a class by itself and attains a degree of efficiency unknown in leather belts. It is water, acid and steam proof.

"Fabreeka" has the same appearance of leather, has the same condensed fibre as leather and corresponds with leather in thickness and weight. But it works better than leather and costs less than leather.

"Fabreeka" has won the admiration of all careful observers by its wonderful performances.

It is doing the work better and relieving the troubles of many belt users where conditions were considered beyond relief. You cannot appreciate its value until you try it. Less first cost, less stoppage from belt troubles, a saving of power and increased production result from its use.

Write today for full information and prices.

Fabreeka Belting Company

30 India Street **Boston, Mass.**

CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also precede merit as surely in machinery as in men.

Time, skill and effort must also precede merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

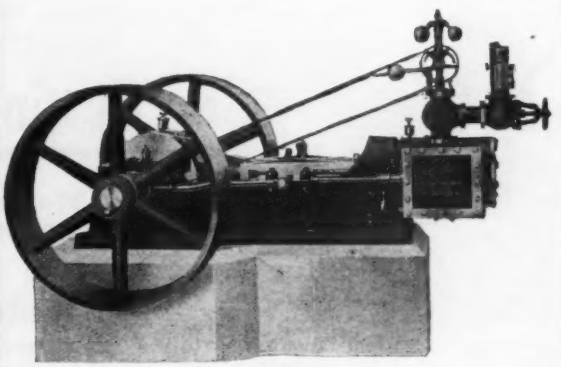
CRESSON-MORRIS COMPANY

ENGINEERS—FOUNDERS—MACHINISTS

PHILADELPHIA, PENNA.

Branch Office, 141 Milk St., Boston, Mass.

20



J. S. Schofield's Sons Co.

Macon, Georgia

MANUFACTURERS OF

High Pressure Return Tubular Boilers,
High Grade Stationary Steam Engines,
Tanks, Stacks, Stand Pipes.
Heavy Castings and Wrought Iron Works.

Speed in Service is Only Rivaled by Accuracy
Each Would Be Useless Without the Other

Unfailing Service

In the struggle and stress of modern business life every moment of delay represents a loss of time and money which cannot be regained.

When promptness, accuracy and dispatch are the vital elements in the delivery of electric equipment or supplies it is natural to turn to the Carter Electric Company for service.

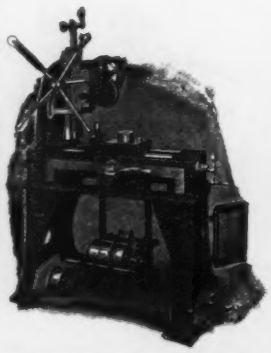
This is an organization whose members are trained to meet the demands of any emergency and this organization is ready to serve you on an instant's notice.

If your requirements cover Rubber Conduit Wire, Switches, Safety Switches, Wiring Devices, Fuses, Lamps or other electric supplies, it is only a matter of a few hours before we can place them in your hands.

This is because our warehouses are always fully stocked—everything you may need and in large quantities—and with every modern facility for handling your business the Carter Electric Company pledges you **Unfailing Service.**

Carter Electric Company

63 Peachtree Street, Atlanta



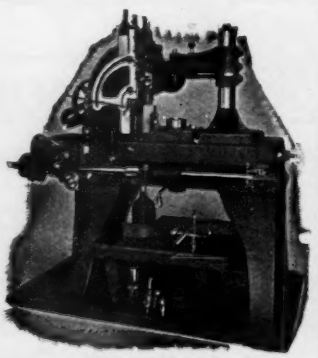
Full Automatic, Semi-Automatic and Hand Operated

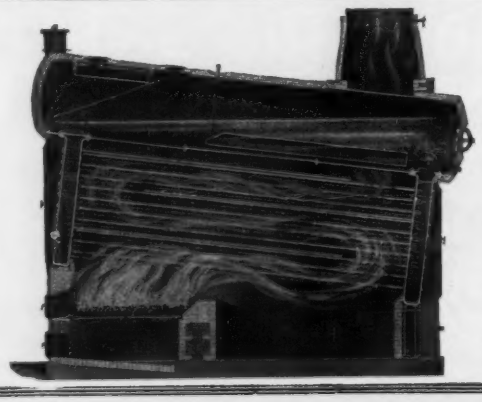
Gear Cutting Machines

Especially adapted for use in Cotton Mills Hundreds now in use. Send for Special Circulars.

The D. E. Whiton Machine Co.,

NEW LONDON, CONN





TUBULAR **BOILERS** WATER TUBE

STEEL CASINGS — TOWERS — TANKS

Our IMPROVED STEEL CASINGS fitted to your Boilers will save you from 10% to 25% in fuel.

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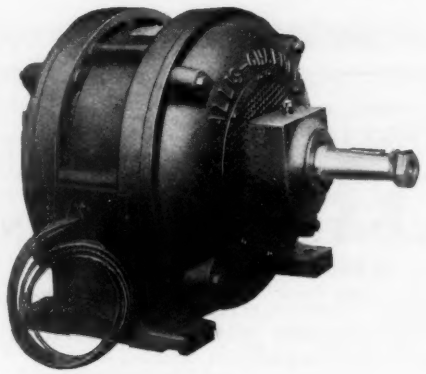
SPINNING FRAME MOTORS

For

Individual Drive



The New Type "AR" Squirrel Cage Motor that has all the requisites for spinning frame drives.

A motor designed particularly for the service with waste packed bearings.

Send for latest Textile Bulletin.

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MANUFACTURING COMPANY
MILWAUKEE, WISCONSIN, U. S. A.

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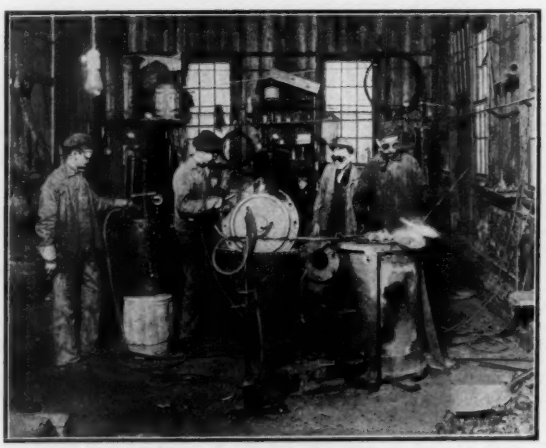

Welding a cylinder, 2090 lbs. and cylinder head 3 inches thick weld 20 inches—for Block Coal Co., Block, Tenn.

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OUR SERVICE SAVES TIME AND MONEY

There is no need of discarding broken machines and machine parts—there is no need of shutting down and waiting an indefinite length of time for delivery of new parts.

Many mills know through experience that should a machine breakdown occur, it can be put back in operation quickly by calling on AUTOGENOUS.

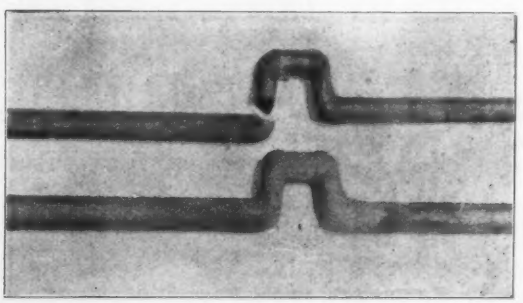
We have just completed the repair on the crosshead and main bearing of a 1200 H.P. engine for the Brookside Cotton Mills. Practically every cotton and knitting mill in the vicinity of Knoxville has taken advantage of and profited by AUTOGENOUS Welding Service. Many of these jobs were extra large and caused a shutdown of the plant, and much time was saved by our quick service.

No matter how bad the break, no matter how small or large the machine or part, AUTOGENOUS Welding Service can save you money.

Full Details Sent on request. Wire, Phone or Write

AUTOGENOUS WELDING CO.

Oxy-Acetylene and Cutting In All Metals.
903-5 No. Central Ave., Junction Central and Broadway, Knoxville, Tenn.



What Would 125 New crank shafts have cost?

A CERTAIN cotton mill, in six months' time made 125 broken crankshafts as good as new with their STANDARD welding apparatus, at costs of less than $2.00 each.

What would 125 new crank shafts have cost them?

Their welded crank shafts are giving as good or perhaps even better service than new ones, and just goes to prove that every cotton mill is not fully equipped without a

Standard Welding and Cutting Machine

We not only supply the machine, oxygen and supplies, but we send experts to your mill and teach your mechanics how to use it.

STANDARD SERVICE

means that if you have a breakdown too large for your own mechanic, our experts are always ready to come to you quickly.

Write today for catalog and price list.

STANDARD GAS PRODUCTS CO., Inc.

Oxygen, Oxy-Acetylene Welding and Cutting Machines and Supplies.

Main Office, Atlanta, Ga.

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American Roofing & Paint Co., Inc.

Dealers in

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Office, 246 Decatur St. P. O. Box 1065
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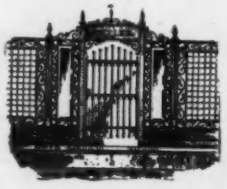
SYDNOR'S SUPREME SERVICE

WELL DRILLING
and **DEEP WELL PUMPS**

We do the engineering and have been solving water problems satisfactorily for 25 years for textile mills.

Sydnor Pump & Well Co., Inc., Richmond, Va.



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WINDOW GUARDS
WIRE CLOTH
Established 1835.
DUFUR & CO.
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Electric Light, Power, Telephone and Bell Wiring for Residences, Stores and Factories. Estimates Furnished.

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All kinds of new and used Electrical Machinery bought, sold and exchanged.

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Telephone your wants. Local and Long Distance, Ivy 1788-1790.

Coal Is Now Moving

Place your order now for our KENTUCKY VELVET LUMP and there will be warmth and good cheer in your home.
Ask some coal expert about this analysis.

Volatile matter	.38	Moisture	1.22
Fixed Carbon	.60	Sulphur	.32
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We handle the Empire, one of the best mines in Alabama. Also steam and mine run coal from Kentucky and Tennessee.

Truitt Coal and Iron Company
ATLANTA, GEORGIA

Advertising conserves the Manufacturer's time by acquainting him with a service or product at his leisure long before the need for such arises.

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The Recognized Standards of Quality
COTTON YARNS

Gray Manufacturing Co.
Arrow Mills, Inc.
Parkdale Mills, Inc.
Flint Manufacturing Co.
Arkray Mills, Inc.
Arlington Cotton Mills
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Our Fine Yarns Make Fine Fabrics

The manufacturers of a number of America's well known textile products can vouch for the strength, uniformity, cleanliness, and better weaving and knitting qualities of our yarns.

The yarns we spin for knitting, weaving, laces and converting, are furnished in all twists on skeins, cones, tubes and warps:

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MYRTLE MILLS INC. COTTON YARNS GASTONIA, N.C.

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Works, 2046-48 Amber Street,
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Cotton Mercerized Tapes, Spool Tapes, Bindings and Narrow Fabrics for Underwear and other Trades.

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LINEN YARNS

For Weaving, Knitting and all Purposes.

TURKEY RED YARNS

For Towel Borders, Towellings and Bleaching Cloth

Linen Jacquard Harness Twine

And Every Description of Linen Thread and Twine

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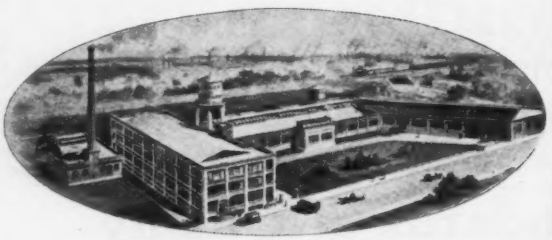


View of our Mercerizing and Bleaching Plant

BOGER & CRAWFORD

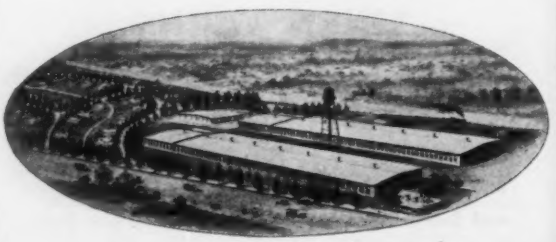
Established 1908

Spinners, Bleachers and Mercerizers of High Grade Combed Yarns

By using our Spinning and Mercerizing you are always assured of a standard product

"From the Cotton Field Direct to You"

Main Office, Factory and Warehouse
J and East Venango Sts., PHILADELPHIA



Spinning Mills, Lincolnton, N. C.

ESTABLISHED 1872

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CARVER-BEAVER YARN CO.

Successors to A. D. SALKELD & BRO., Inc.

ALL NUMBERS COTTON MERINO **YARNS** ALL COLORS WOOL WORSTED

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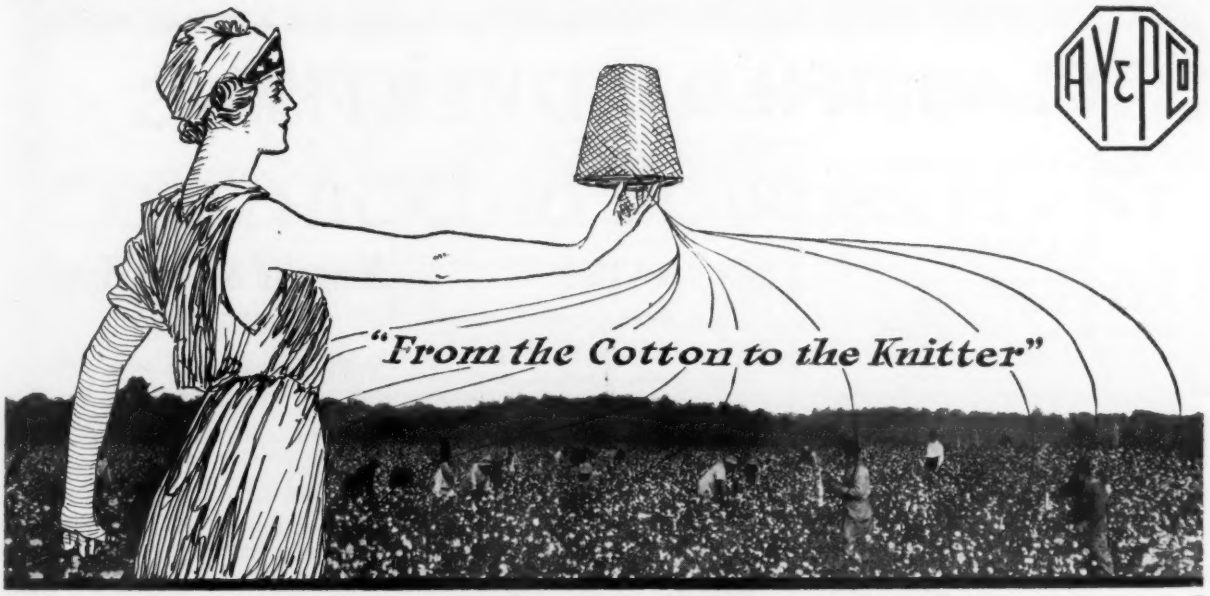
ADVERTISING is an economy and cuts the cost of selling, making lower prices or better goods possible without sacrifice of the sellers' profits.



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AMERICAN YARN & PROCESSING CO.

MOUNT HOLLY, N. C.

SPINNERS AND MERCERIZERS

HIGH GRADE COMBED AND CARDED YARNS—16s to 80s

Our Mercerized Yarns Are the Product of Our Own Mills

General Office, Mt. Holly, N. C. **Branch Office, 1111 James Bldg., Chattanooga, Tenn.**

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H. B. ROBIE, 346 Broadway, New York City **FORREST BROS., Forrest Bldg., Philadelphia**

THE MARTINIQUE

(Affiliated with Hotel McAlpin)

Broadway, 32nd and 33rd Streets

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SITUATED IN CENTRE OF SHOPPING DISTRICT—Adjacent to Theatre Section

Entrance from Hotel to New York Subway and Hudson Tubes affording direct communication with the Pennsylvania and Grand Central Stations, also general Post Office and Railroad Stations at Jersey City.

The Restaurants offer a truly McAlpin Service—with Club Breakfasts, Special Luncheons and Dinners, also a la Carte Service—All at moderate prices.

600 ROOMS

PLEASANT ROOMS FROM $2.50 UP.

FRANK E. JAGO—Resident Manager

NATIONAL BANK OF COMMERCE IN NEW YORK 1839

Guidance, Custody and Care of Investments

The National Bank of Commerce in New York, through its Bond Department, supplies to its friends complete information on all investment securities.

Services of experienced men are available to guide in properly balancing and adapting investments to suit particular needs.

The large volume of investments handled through us insures close quotations and efficient brokerage service. We are in a position to give impartial counsel on investment matters.

Securities may be left in our care for collection of coupons and owners will be advised as to income tax certificates, announcement of "rights," conversion privileges and exchange for new forms.

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Capital, Surplus and Undivided Profits Sixty Million Dollars

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WANTED

Second hand looms suitable for weaving No. 0 or No. 1 Duck. State make, price and where they can be seen.

Address Box 43, Care COTTON, Grant Bldg., Atlanta, Ga.

WANTED

Superintendent of Dyeing, one familiar with Vat, Sulphur, Direct, Developed Colors. Write fully Age, Experience, etc.

Address

Box 44, care of COTTON, Grant Bldg., Atlanta, Ga.

Salesman Wanted

Salesman acquainted with buyers and who can obtain orders for sa'es and order books, can make favorable commission arrangements with leading Chicago concern in this line. Chicago Sales Book Co., 337 W. Madison St., Chicago.

THE ROBERTS LOOSE END PREVENTER FOR WARPERS

No mill can afford to do without this attachment. Small cost with best results. For further particulars write to

Roberts & Graddick Co.,
P. O. Box 194 Winder, Georgia.

RATES:

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"For Sale" and all other advertisements using bold-face type or otherwise displayed, $2.00 per inch per insertion.

Rates for larger spaces furnished on application.

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"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

"Positions Open" and other undisplayed advertisements, 4 cents per word per insertion. Minimum charge $1.00. Payable in advance.

(When replies are to be received in our care, allow four words for box address,)

FOR SALE

Nine thousand spindle cotton mill, with hydro electric plant, and forty-two hundred acres improved land, located at Speigner, near Montgomery, Alabama. For particulars address

STATE BOARD OF CONTROL & ECONOMY
Montgomery, Ala.

New and Second Hand

ENGINES

Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING

Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors

AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,
127-31 N. Third St.
Philadelphia, - Pennsylvania

Quality Picker Sticks

Made exactly to patterns of tough, straight-grained, Kentucky Hill Hickory—sand finish. Send sample and let us quote.

Bush Brothers & Company
Louisville, Ky.

STENCILS FOR COTTON SHIPPERS, COTTON MILLS, MERCHANTS & MANUFACTURERS - ALSO BRUSHES, INK, MARKING POTS.
RUBBER STAMPS, NOTARIAL AND CORPORATION SEALS
ATLANTA RUBBER STAMP & STENCIL WORKS
OFFICE 33 LUCKIE ST. WORKS: 350 EDGEWOOD AVE.
P.O. BOX 859 OLDEST STENCIL AND STAMP HOUSE IN GEORGIA ATLANTA, GA.

BALL BEARINGS Chapman
YOU PAY FOR THEM WHETHER YOU BUY THEM OR NOT
MANUFACTURED BY
TRANSMISSION BALL BEARING CO.
1061 Military Road Buffalo, N. Y.

WATER
WE-FU-GO AND SCAIFE
PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES
WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

MACHINERY BARGAINS

FROM THE GIGANTIC

OLD HICKORY POWDER PLANT

COTTON DRY AND FINISHING HOUSE EQUIPMENT

30 COTTON DRYERS. Maker, Sargent's Sons Corporation. No. 24 six section 8' cotton dryers. Overall dimensions, 99 4" long, 15'5" wide, 7'10" high. Constructed throughout of metal angles and plates. Equipped with Model "M" self feeder which feeds direct onto 4x4 mesh, No. .092 gauge wire cloth endless belt or apron which extends entire length of dryer. Heating coils located at one side of dryer, 1½" pipe, to give 15,556 sq. ft. of heating surface. Hot air drawn through belt by 33" exhaust fans. All fans mounted on tube shafts with double ball bearings. Equipped throughout with automatic sprinkler system.

30 MIXING PICKERS. Maker, Sargent's Sons Corporation. Cylindrical type, 48" Mixing Pickers. 15 right hand, 15 left hand. Feed apron, heavy leather belt, with maple slats. Equipped with single pair fluted feed rolls, 3½" diameter. Feed roll bearings held by springs to insure proper tension. Main cylinder built up on heavy cast iron spiders, mounted on 2 7/16" shaft.
Cylinder provided with 6 heavy steel bars on lugs bolted to spider. Tight and loose driving pulleys 12" x 6". Speed 800 to 1,000 R.P.M. Capacity 600 to 800 lbs. per hour. Horsepower required, 4 to 8, according to material handled.

30 COTTON WASHERS. Maker, Sargent's Sons Corporation. 48" Special cotton washers or rinsers. Right hand and left hand. Complete with cast iron frame, pans, squeeze rolls, kicker and conveyor.

30 FEEDERS. Maker, Sargent's Sons Corporation. 48" Model "M" feeders for Sargent Dryers.

10 CONCENTRATORS. Maker, Noble & Wood Co. Right hand and left hand cylinder washers with octagon cylinder, diameter 44" length 42". Cylinder heads gulf cypress. Buckets 1" native pine. Cast iron outlet with wide discharge openings. Steel shaft passes through center of outlet and flanged on opposite side. Outlet and flange bolted to beaded cylinder head. Rotates at 6 R.P.M. Vat is 1'4½" wide, 6'9" long, 2'9" high.

WRINGERS.

70 42" Centrifugal Wringers. Maker, American Tool & Machine Company, Boston, Mass. Complete with 42" perforated steel basket shell, with steel top, basket 22½" inside depth, ⅜" steel. Bottom of basket composed of steel plate riveted to cast iron center, spindle plate, with valve opening. Steel spindle is bolted to plate with three tap bolts. Spindle is connected at top to a special brake and clutch, which is supported on 10", 1 25 lb. and 10" channels. Also a 7/16" shaft and flexible couplings directly connected to a 40 H.P. motor, which drives the wringer. The curb is made of ½" steel, 50" inside diameter, 2'6" deep, with cast iron bottom 12" deep.

18 Sets, 36" belt-driven Centrifugal Wringers. Maker, American Tool & Machine Co. Each set arranged in batteries of three. Supporting frames of cast iron, braced with steel rods; curb, bottom and top of cast iron; basket of perforated steel plates. Each wringer is equipped with clutch and driving pulley.

EXTRACTOR.

1 48" Overdriven Extractor. Maker, American Laundry Machinery Co. Basket made with shell of heavy galvanized boiler steel, perforated, and riveted to brass ring at top and at bottom to heavily galvanized casting, which fits around spindle shaft. Basket reinforced by cast iron bands. Outer curb of cast iron with detachable top or rim supported from frame tripod. Outer curb and inner basket swing free from base on tripod. Base cast in one piece, mounted on rubber bearings. Fitted with tool steel spindle shaft, driving pulleys, upper and lower bearings, brake and countershaft.

In addition, there is available at Old Hickory, power equipment, pumps, engines, machinery pipe, tanks and supplies. The following bulletins covering these items have been prepared and will be sent on request.

Bulletin No. 5, New and Used Belting.
Bulletin No. 7, Steel and Wood Tanks.
Bulletin No. 8, Boilers, Engines, Motors, etc.
Bulletin No. 9, Miscellaneous Equipment.
Bulletin No. 10, Pumps of All Kinds.
Bulletin No. 11, Blowers and Exhaust Fans.
Bulletin No. 12, Industrial Railway Equipment.
Bulletin No. 13, Hardware and Supplies.
Bulletin No. 14, Chemical Ware and Technical Machinery.

It is suggested that purchasing agents or plant superintendents be sent to Old Hickory to look over the supply of surplus materials and equipment, and inspect the articles in which they may be interested. Old Hickory is 12 miles from Nashville, Tenn, and can be reached by interurban cars or by automobile jitney busses, which run at frequent intervals. There are good hotel accommodations at Old Hickory, and it is advised that interested parties spend several days looking over the immense stocks at this place.

NASHVILLE INDUSTRIAL CORPORATION
JACKSONVILLE, TENN.

Buyers' Index

Acetylene Gas.
Commercial Acetylene Supply Co.
Standard Gas Products Co.

Acetylene Welding Apparatus.
(See Welding Apparatus).

Accountants.
(See Auditors and Accountants).

Air Washers.
Bayley Mfg. Co.
Carrier Eng. Corp.
Parks-Cramer Co.

Air Conditioning Systems.
(See Humidifying Apparatus).

Albone.
Roessler & Hasslacher Chemical Co.

Alkalies.
(See Dyestuffs and Chemicals).

Aniline Colors.
(See Dystuffs and Chemicals).

Anti-Chlornie.
(See Dyestuffs and Chemicals).

Aprons-Rub.
Smith & Furbush Machine Co.

Architects and Engineers.
Lockwood, Greene & Co.
Robert & Co.
Spiker & Lose.
Sirrine, J. E.

Ash Handling Machinery.
(See Coal Handling Machinery).

Asphalt Slate Shingles.
(See Slate Asphalt Roofing).

Auditors and Accountants.
American Audit Co.
Ernst & Ernst.

Auto Trucks.
(See Trucks—Auto).

Automatic Controllers (Temperature).
(See Temperature Controllers.)

Automatic Loom Attachments.
(See Loom Attachments).

Automatic Feeds for Cotton.
Proctor & Schwartz, Inc.
Saco Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Mch. Co.
Whitin Mch. Works.

Automatic Guider (Electric).
Blake Electric Mfg. Co.

Backwashers.
Sargent's Sons Corp., C. G.

Automatic Scales.
(See Scales).

Ball Bearings.
Aldrich Mch. Works.
Fafnir Bearing Co.
Hyatt Roller Bearing Co
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.

Ball Bearing Housings.
Aldrich Mch. Works.
Fafnir Bearing Co.

Bale Band Buckles.
(See Box Strapping & Buckles).

Bale and Box Ties.
Signode System, Inc.

Baling Machines.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Famous Mfg. Co.
Galland-Henning Mfg. Co.
Saco-Lowell Shops.

Baling Presses.
(See Presses).

Bandages, Tapes, Etc.
American Textile Banding Co.

Bands.
(See Tapes).

Banding Straps and Buckles.
Signode System, Inc.

Banks.
Atlanta National Bank.
Citizens & Southern Bank.
National Bank of Commerce In New York.
National Shawmut Bank.
Textile Banking Co.

Barrels—Fibre.
(See Fibre Products).

Baskets—Mill.
(See Boxes—Mill).

Bath Cabinet—Shower.
Crane Co.
Manufacturing Equipment & Engineering Co.
Sanymetal Products Co.

Batteries (Elec.).
(See Storage Batteries).

Beams.
Mossberg Pressed Steel Corp.
Walraven Co.

Beam Dyeing Machines.
Cocker Mchry. & Foundry Co.

Beam Heads.
Mossberg Pressed Steel Corp.
Walraven Co.

Beaming and Warping Mchry.
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Bearings.
Cresson-Morris Co.
Diamond State Fibre Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.
Wood's Sons Co., T. B.

Belting.
American Supply Co.
Fabreeka Belting Co.
Walraven Co.
Williams & Sons, I. B.

Belting—Chain Link.
Link-Belt Company.
Morse Chain Co.

Belting—Rope.
(See Rope Transmission).

Belt Conveyors.
Link-Belt Company.
Morse Chain Co.

Belt Dressing.
Walraven Co.
Williams & Co., I. B.

Belt Fasteners.
Columbia Novelty Mfg. Co.
Flexible Steel Lacing Co.

Belt Lacing.
Fabreeka Belting Co.
Columbia Novelty Mfg. Co.
Flexible Steel Lacing Co.
Walraven Co.
Williams & Sons, I. B.

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Link-Belt Company.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

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Lupton's Sons, Co., David.

Benches (Park and Playground).
(See Playground Equipment).

Bleacheries.
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Bleaching Kiers.
Butterworth & Sons Co., H. W.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machinery Co., The.

Bleaching Machinery.
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Bleaching, Finishing and Sizing Materials.
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Blowers and Blower Systems.
Bayley Mfg. Co
Carlisle & Gale Co.
Carrier Eng. Corp.
Clements Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Boards—Fibre.
Diamond State Fibre Co.

Boards—Form.
Pearson, Jos. T.

Bobbins.
Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
Vermont Spool & Bobbin Co.
Walraven Co.
Whitin Machine Works.

Bobbin Heads.
Diamond State Fibre Co.

Boilers.
International Engineering Works, Inc.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Boiler Feed Water Purification.
American Water Softener Co.
Norwood Engineering Co.
Permutit Co.
Scaife & Sons, Wm. B.

Boiler Room Fittings & Supplies.
Crane Co.
International Engineering Co.
Lunkenheimer Co.
Nashville Industrial Corp.

Boiler Grates and Stokers.
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Box Strapping and Tie Buckles.
(See Banding Straps & Buckles).

Boxes—Mill.
Diamond State Fibre Co.
Hightower Box & Tank Co.
Lane & Bros., W. T.
Standard Fibre Co.
Walke Box Co.

Boxes—Packing.
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Boxes (Steel).
Lyon Metallic Mfg. Co.

Braid.
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Brake Linings.
Diamond State Fibre Co.

Brazing.
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Brokers—Stock.
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Atlanta Brush Co.
Harris Broom Co.
Southern Brush & Broom Co.
Southwestern Broom Mfg. Co.

Brushes—Commutator.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Buckets and Pails—Mill.
Diamond State Fibre Co
Standard Fibre Co.

Buckets—Elevator and Grab.
Link-Belt Company.

Buckles—Cotton Tie.
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Building Contractors.
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Building Material.
American Roofing & Paint Co.
Barrett Co., The.
Birmingham Slag Co.
Carlisle & Gale Co.
Dowman, Geo.
Dufur & Co.
Lockwood, Green & Co.
Lupton's Sons Co., David
Sanymetal Products Co.
Southern Cypress Mfg. Asso.

Bungalows.
(See Houses—Ready Built).

Burr Pickers.
Sargent's Sons, C. G.
Smith & Furbush Machine Co.

Bushings.
Diamond State Fibre Co.
Southern Spindle & Flyer Co.
Shambow Shuttle Co.
Walraven Co.

Cabinets.
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Calenders.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co.

Calender Rolls.
Campbell Mfg. Co.
Butterworth & Sons Co., H. W.
Roy & Son, B. S.
Textile Finishing Machinery Co.

Calling System—Inter-Telephone.
Bryan Electric Co.
Carter Electric Co.

Cans—Roving.
Diamond State Fibre Co.
Standard Fibre Co.

Cars and Trucks—Fibre.
(See Trucks).

Carbonizing Machines.
Cocker Mch. & Fdry Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons & Co., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Mch. Wks.

Carding Machinery and Supplies.
Howard Bros. Mfg. Co.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

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Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Carrier Aprons.
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Carrier System.
Curtis Pneumatic Machinery Co.
Dowman, George.
Richards-Wilcox Mfg. Co.

Cases—Wooden.
(See Boxes).

Casement Window Hardware.
Richards-Wilcox Mfg. Co.

Castings.
Cresson-Morris Co.
Lombard Foundry & Mch. Co.
Walsh & Weidner Boiler Co.

Caustic Soda.
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Cement Reinforcement.
Birmingham Slag Co.

Cement and Brick Coating.
Du Pont de Nemours & Co., E. I.
Wadsworth Howland & Co., Inc.

Central Station (Electric).
Georgia Railway & Power Co.

Centrifugals.
Cresson-Morris Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

Chain Drives.
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Chain—Block, Bicycle, Auto, Engine, Agricultural, Etc.)
Morse Chain Co.

Chairs and Stools.
Manufacturing Equipment & Engineering Co.
Southern Theatre Equipment Co.

Chemicals.
(See Dyestuffs and Chemicals).

Chlorine Gas.
Electro Bleaching Gas Co.

Cleaning Machine—Blower.
Clements Mfg. Co.

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Clocks—Watchman.
Chicago Watchman Clock Co.

Closets—Water.
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Firsching, J. A.
Wildman Mfg. Co.

Cloth Guider (Electric).
Blake Electric Mfg. Co.

Cloth Reels.
Gallaudet Aircraft Corp.

Cloth Room Machinery.
Butterworth, H. W., & Sons Co.
Firsching, J. A.
Saco-Lowell Shops.
Scott & Co., Henry L.
Textile Finishing Machinery Co.
Wildman Mfg. Co.

Cloth Shrinking Machinery.
Reliance Machine Works.
Tolhurst Mch. Wks.

Cloth Testers.
Scott & Co., Henry L.

Cloth Winders.
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Allis-Chalmers Mfg. Co.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Link-Belt Company.
Wood's Sons Co., T. B.

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Diamond State Fibre Co.

Coal.
Truitt Coal & Iron Co.

Coal & Ash Handling Machinery.
Link-Belt Company.

Coal Tar Disinfectants.
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Commission Merchants & Dealers.
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Compressors—Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Walraven Co., The.

Concrete Reinforcement.
Birmingham Slag Co.

Condensers.
Allis-Chalmers Mfg. Co.

Conduits.
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Connectors—Frankel Solderless.
Westinghouse Elec. & Mfg. Co.

Consulting Engineers.
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Contractors and Engineers—Building.
Foundation Co.
Sirrine & Co. J. E.
Spiker & Lose.
Tufts Co., Arthur.

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American Roofing & Paint Co.

Contractors (Roofing.)
American Roofing & Paint Co.

Controlling Instruments—Temperature.
General Electric Co.
Powers Regulator Co.

Conveyors—Belt.
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American Supply Co.
Collins, J. D.
Cresson-Morris Co.
Curtis Pneumatic Machinery Co.
Dowman, George.
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Walraven Co.

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Cooling and Conditioning Machines.
Manufacturers Machine Co.

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Saco-Lowell Shops.
Smith & Furbush Mach. Co.
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Cotton Yarn and Cloth Commission Merchants and Dealers.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Florsheim, H. A.
Hunter Mfg. & Comm. Co.
Lane & Co., J. H.
Turner, J. Spencer
Weimar Bros.
Woodward Baldwin & Co.

Cotton Merchants and Brokers.
Beer, H. & B.

Cotton Mills.
Amer. Yarn & Processing Co.
Boger & Crawford.
Gray Mfg. Co.

Cotton Mill Machinery and Supplies.
Barber-Colman Co.
Blake Electric Mfg. Co.
Boston Machine Works Co.
Butterworth & Sons, H. W.
Cocker Mach. & Foundry Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Eclipse Textile Devices, Inc.
Firsching, J. A.
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Sargent's Sons Corp., C. G.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield Co., Wm.
Shambow Shuttle Co.
Slaughter Mchry. Co., G. G.
Smith & Furbush Mach. Co.
Southern Bending Co.
Stafford & Co.
Steel Heddle Mfg. Co.
Terrell Machine Co.
Textile Fininshing Machinery Co.
Textile Specialty Co.
Tolhurst Mch. Wks.
Universal Winding Co.
Vermont Spool & Bobbin Co.
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Boston Machine Works.
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Cresson-Morris Co.
Wood's Sons Co., T. B.

Covers—Rollers.
Diamond State Fibre Co.

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Southern Cypress Mfg. Asso.

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Lupton's Sons Co., David.

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Davison's Textile Blue Book.

Discs—Fibre.
Diamond State Fibre Co.

Disinfectants.
Barrett Co., The
Sanitas Co.

Dobby Chains.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

Docks and Warehouses.
American Dock & Pouch Terminals.

Doffing Boxes—Mill.
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Door Closers and Checks.
Richards-Wilcox Mfg. Co.

Doors & Elevator Enclosures.
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Door Hangers.
Dowman, George.
Richards-Wilcox Mfg. Co.

Doors—Steel.
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Greist Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.

Drying Apparatus.
Pevley Mfg. Co.

Drying Forms—Hosiery.
Pearson, Jos. T.

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American Laundry Mchry. Co
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Proctor & Schwartz, Inc.
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Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
American Yarn & Processing Co
Boger & Crawford.
Franklin Process Co.

Dyeing, Bleaching, Finishing and Printing Machinery.
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
East Jersey Pipe Co.
Electro Bleaching Gas Co.
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Fletcher Works.
Franklin Process Co.
Klauder-Weldon Dyeing Mch. Co.
Manufacturers Machine Co.
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Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Schaum & Uhlinger.
Textile Finishing Machinery Co. The.
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Dyeing Machines (Package and Spool.)
Franklin Process Co.

Dye Sticks.
Phila. Drying Machinery Co.

Dyestuffs and Chemicals.
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Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
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Klipstein & Co., A.
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United Chemical Products Corp.
Wolf & Co., Jacques.

Elastic Stockings.
Estes Surgical Supply Co.
Perryman-Burson Co.

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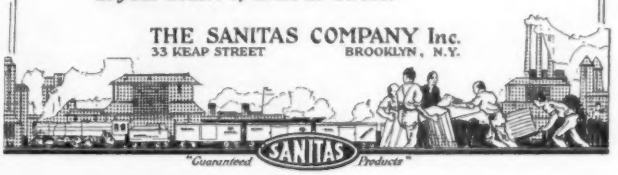

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Permutit Co.
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Permutit Co.

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Wolf & Co., Jacques.

Fire Doors and Hardware.
Dowman, George.
Richards-Wilcox Mfg. Co.
Sanymetal Products Co.
Vonnegut Hardware Co.

Fire Hose.
(See Hose—Fire).

Fire Protecting Paint.
(See Paint).

First Aid Room Equipment and Supplies.
Estes Surgical Supply Co.
Perryman-Burson Co.

Flexible Couplings.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.

Flood Lights—Electric.
General Electric Co.

Flooring—Hardwood.
Hightower Box & Tank Co.
Southern Cypress Mfg. Co.

Floor Scrubbing Machine.
American Scrubbing Equip. Co

Floor Scrubbing Powders.
India Alkali Works.

Floor Sweeps.
See Brushes.

Fluted Rolls.
Howard & Bullough.
Saco-Lowell Shops.
Schofield & Sons, J. S.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co
Whitin Machine Works.

Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Founders.
Cresson-Morris Co.
Lombard Fdry. & Mch. Works

Fountains—Drinking.
Crane Co.
Manufacturing Equipment & Engineering Co.
Miles Refrigerating Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.
Twentieth Century Brass Works.

Friction Clutches.
(See Clutches—Friction).

Fuel.
(See Coal).

Fuses.
(See Elec. Mchy. and Supplies).

Garage Doors and Door Hardware.
Richards-Wilcox Mfg. Co.

Garnett Machines.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.

Gas Engines.
(See Engines—Gas).

Gaskets.
Diamond State Fibre Co.

Gauge Cocks.
Lunkenheimer Co.

Gauge—Oil.
Lunkenheimer Co.

Gauges—Water.
Lunkenheimer Co.

Gears—Silent.
Diamond State Fibre Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.

Gear Cutting and Cutters.
Cresson-Morris Co.
Whitin Machine Co., D. E.

Gear Pullers.
General Electric Co.

Generators—Electric.
(See Motors and Generators).

Glassware and Dishes.
(See Dishes).

Governors—Pump.
General Electric Co.

Grates—Boiler.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

Grates—Mechanical.
(See Stokers).

Grease.
(See Lubricants).

Grease Cups.
(See Lubricators).

Grindstones.
Richards-Wilcox Mfg. Co.

Grinders—Card. Cylinder, Roll, Napper and Garnet.
(See Card Grinding Machinery).

Guards—Electric Lamp.
Bryan Electric Co.
Flexible Steel Lacing Co.

Guides—Thread.
Palmer Co., I. E.

Guider (Cloth-Electric.)
Blake Electric Mfg. Co.

Gums.
(See Finishing and Sizing Materials).

Hangers.
(See Shafting and Hangers).

Hardware (Building.)
Richards-Wilcox Mfg. Co.
Sanymetal Products Co.
Vonnegut Hardware Co.

Harness—Loom.
American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.

Heads—Bobbin and Spool.
Diamond State Fibre Co.

Heaters.
Bayley Mfg. Co.

Heating and Ventilating Apparatus.
(See Ventilating Apparatus).

Heddles.
Crompton & Knowles Loom Wks.
Draper Corporation.
Howard Bros. Mfg. Co.
Steel Heddle Mfg. Co.

Heddle Frames.
Crompton & Knowles Loom Wks.
Steel Heddle Mfg. Co.

Hoists.
Curtis Pneumatic Mchry. Co.
Link-Belt Company.
Morse Chain Co.
Walraven Co.

Hose—Fire.
Collins, J. D.
Walraven Co.

Hosiery Dyeing Machinery.
Cocker Mach. & Fdry. Co
Franklin Process Co.

Hosiery Forms.
(See Drying Forms).

Hosiery Yarns.
(See Yarn Manufacturers).

Hospital Equipment and Supplies.
Estes Surgical Supply Co.
Perryman-Burson Co.

Hotels.
Hotel Martinique.
Hotel Sinton.
Hotel Tuller.

Humidifying Apparatus.
American Moistening Co.
Bayley Mfg. Co.
Carrier Eng. Corp.
Manufacturers Machine Co.
Parks-Cramer Co.

Humidity Indicating Instruments.
Powers Regulator Co.

Hydraulic Turbines.
(See Turbines—Hydraulic).

Hydro Extractors.
(See Extractors).

Ice Machines.
Miles Refrigerating Co.
Southern Ice Machine Co.

Indicating and Recording Instruments and Thermometers.
General Electric Co.
Powers Regulator Co.

Indigo.
(See Dyestuffs and Chemicals).

Industrial Sites.
Nashville Industrial Corp.

Injectors.
Lunkenheimer Co.

Insulation—Vulcanized Fibre.
Diamond State Fibre Co.

Ink—Stencil and Marking.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.

Iron Work—Ornamental.
Cyclone Fence Co.
Dufur & Co.
Lombard Iron Works & Supply Co.

Jack Spools.
(See Spools).

Jacquards.
Crompton & Knowles Loom Wks.

Jute Bagging Machine.
Smith & Furbush Machine Co.

Kettles—Size.
(See Size Kettles).

Kettles—Soda.
Lombard Iron Works & Sup. Co.

Kiers.
(See Bleacher Kiers).

Knit Goods Specialties.
Knit Goods Specialty Co.

Knit Goods.
(See Cotton Cloth Commission Merchants and Dealers).

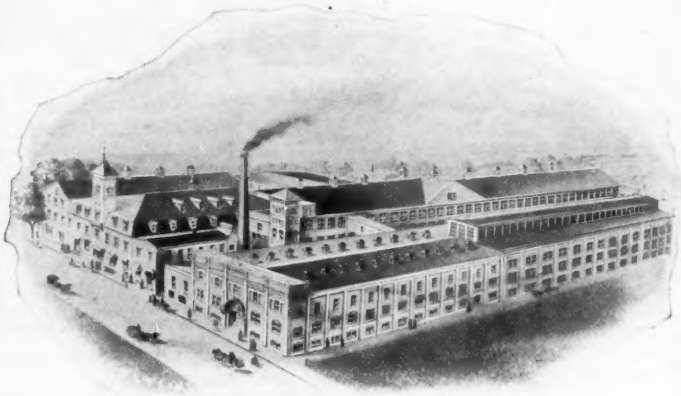
Knit Goods Washers.
(See Washers—Cloth).

Knitting Machinery and Supplies.
Brinton Co., H.
Cumiskey Co., Edw. F.
General Machine Works.
Hemphill Mfg. Co.
Markem Machine Co.
Scott & Williams.
Trump Bros. Machine Co.
Wildman Mfg. Co.

Knitting Machine Power Attachment.
Cumiskey Co., Edw. F.

Laboratory Instruments and Thermometers.
Estes Surgical Supply Co.
Perryman-Burson Co.

Lacing—Belt.
(See Belt Lacing).



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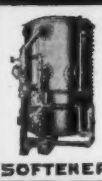

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Cooper Hewitt Electric Co.
Cutter Works, George.
General Electric Co.
Walraven Co.
Westinghouse Elec. & Mfg. Co.

Lamp Guards—Key Locking.
Bryan Electric Co.
Flexible Steel Lacing Co.

Lamp Reflectors.
Bryan Electric Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Cutter Works, George.
Westinghouse Elec. & Mfg. Co.

Landscape Architects.
(See Village Architects).

Lappers.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Latches (Fire Exit Self-Releasing.)
Vonnegut Hardware Co.

Laundry Machinery.
American Laundry Mach'y Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

Lavatories.
Crane Co.
Manufacturing Equipment & Engineering Co.
Vogel Co., Jos. A.

Leather Belting.
(See Belting).

Leather Specialties.
American Supply Co.
Williams & Sons, I. B.

Lights—Flood.
Cutter Works, George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Linen Yarns.
(See Yarns—Linen).

Link Belting.
(See Belting—Link).

Linters.
(See Waste Dealers).

Liquid Chlorine.
(See Chlorine).

Loaders—Wagon and Truck.
Link-Belt Company.

Locks and Latches.
Richards-Wilcox Mfg. Co.

Lockers—Metal.
Collins, J. D.
Sanymetal Products Co.

Logwood Extract.
(See Dyestuffs and Chemicals).

Looms.
Crompton & Knowles Loom Wks.
Draper Corporation.
Fletcher Works.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.

Loom Attachments—Automatic.
Draper Corporation.

Loom Harness.
(See Harness).

Lubricants.
D-A Lubricant Co.
N. Y. & N. J. Lubricant Co.
Swan & Finch Co.
Texas Co.

Lubricators.
Lidseen
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.

Lug Straps.
(See Straps—Lug).

Lumber.
Southern Cypress Mfg. Asso.

Lunch Room Equipment.
(See Restaurant).

Machine Tools.
(See Tools).

Machinists.
Cresson-Morris Co.

Marking Machines.
Markem Machine Co.

Marking Pots, Stencils, Inks, Etc.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

Mercerized Yarns.
(See Yarn Manufacturers).

Mercerizers.
Amer. Yarn & Processing Co.
Boger & Crawford.

Mercerizing Machinery.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

Metal Ceilings, Etc.
Dowman, Geo. A.
Lupton's Sons Co., David.

Metals—Perforated.
(See Screens and Sieves).

Metal Workers—Sheet.
Lombard Iron Works & Supply Co.

Meters—Flow, Air, Gas, Electric Steam, Etc.
Allis-Chalmers Mfg. Co.
Bryan Electric Co.
Carter Electric Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Mill Baskets and Boxes.
(See Boxes—Mill).

Mill Engineer.
(See Architects and Engineers).

Mill Villages.
(See Villages).

Mill Supplies—Miscellaneous.
(See Supplies—Mill).

Mill White Paint.
(See Paint).

Monorail Conveying Systems.
Richards-Wilcox Mfg. Co.

Mops.
Atlanta Brush Co.
Harris Broom Co.
Southern Brush & Broom Co.
Southwestern Broom Mfg. Co

Motion Pictures
(See Films.)

Motors and Generators—Electric.
Allis-Chalmers Mfg. Co.
Bryan Electric Co.
Carter Electric Co.
General Electric Co.
Nashville Industrial Corp.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.

Motor Power attachments for Knitting Machines.
Cumiskey Co., Edw. F.

Musical Instruments & Supplies.
Cable Piano Co.

Needle Beds.
Cumiskey Co., Edw. F.

Moving Picture Mch. & Supplies.
(See Theatre Equipment).

Nappers.
Roy & Son Co., B. S.

Napper Clothing.
Howard Bros. Mfg. Co.

Office Partitions.
Sanymetal Products Co.

Oils.
D-A Lubricant Co.
Johnson & Co., Inc., Oliver.
Texas Co.
Wadsworth, Howland & Co., Inc.

Oils—Finishing.
(See Finishing and Sizing Materials).

Oils—Lubricating.
(See Lubricants).

Oil Cans.
Lidseen

Oil Cups.
(See Lubricators).

Oil Paper.
Bradley Mfg. Co., A. J.

Oiling Devices.
(See Lubricators).

Openers for Cotton, Wool, Waste, Etc.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Overhead Carriers.
Dowman, George.

Oxidizing Machinery.
Cocker Mch. & Fdry. Co
Phila. Drying Machinery Co.

Oxygen.
Commercial Acetylene Supply Co.
Standard Gas Products Co.

Packing Boxes & Cases—Wooden.
Hightower Box & Tank Co.
National Asso. of Box Mfgrs.
Walke Box Co., Inc.

Packings.
Augusta Mill Supply Co.
Walraven Co.

Paint.
American Roofing & Paint Co.
Barrett Co., The.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Inc., Oliver.
Wadsworth, Howland & Co., Inc.

Painting Contractors.
(See Contractors.)

Panel Boards.
(See Switchboards).

Paper.
Bradley Mfg. Co., A. J.
Diamond State Fibre Co.

Partitions (Office and Toilet).
Sanymetal Products Co.

Perforated Metal.
(See Screens and Sieves).

Partitions—Steel.
Dowman, Geo.
Lupton's Sons Co., David

Peroxides.
Roessler & Hasslacher Chemical Co.

Piano & Players.
Cable Piano Co.

Pickers—Curled Hair.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Pickers—Leather.
Garland Mfg. Co.

Picker Sticks.
Garland Mfg. Co.
Southern Bending Co.
Shambow Shuttle Co.
Walraven Co.

Picking Machinery.
Howard & Bullough, Am. Machine Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Pinions.
Diamond State Fibre Co.
General Electric Co.

Pipe and Pipe Fittings.
Crane Co.
East Jersey Pipe Co.
Lunkenheimer Co.
Parks-Cramer Co.
Scaife & Sons Co., Wm. B.
Walraven Co.

Pipe Threading and Cutting Machines.
Walraven Co., The.

Playground Apparatus Equipment.
Crane Co.
Manufacturing Equipment & Engineering Co.
Puro Sanitary Drinking Fountain Co.
Taylor, Halsey W.
Twentieth Century Brass Works.

Pneumatic Machinery & Tools.
Curtis Pneumatic Mchry. Co.

Portable Conveyors.
(See Conveyor.)

Power (Electric.)
Georgia Railway & Power Co.

Power Transmission.
Aldrich Mach. Works.
Allis-Chalmers Mfg. Co.
Carlyle-Johnson Mch. Co
Columbus Novelty Mfg. Co.
Cresson-Morris Co.
Fabreeka Belting Co.
Fafnir Bearing Co.
Flexible Steel Lacing Co.
General Electric Co.
Hyatt Roller Bearing Co.
Link-Belt Company.
Manufacturing Equipment & Engineering Co.
Morse Chain Co.
Skayef Ball Bearing Co.
Slaughter Mchry. Co., G. G.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

Pressed Steel.
Lupton's Sons Co., David.

Presses.
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Economy Baler Co.
Famous Mfg. Co.
Galland-Henning Mfg. Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Printing.
Byrd Printing Co.
Dowman Wilkins Printing Co.
Richards Printing Co., J. B.
Showalter Printing Co., A. J.

Pulleys.
Cresson-Morris Co.
Diamond State Fibre Co.
Link-Belt Company.
Walraven Co., The.
Wood's Sons Co., T. B.

Pulley Covering.
Williams & Sons, I. B.

Pumps.
Allis-Chalmers Mfg. Co.
Sydnor Pump & Well Co., Inc.
Toomey, Frank.
Walraven Co.
Walsh & Weidner Boiler Co., The.
Westinghouse Elec. & Mfg. Co.

Pump Valves.
(See Valve Discs).

Quill Cleaning Machines.
Terrell Machine Co.

Receptacles—Fibre.
(See Fibre Products).

Recording Instruments.
Boston Machine Works.
General Electric Co.
Powers Regulator Co.

Reeds.
American Supply Co.
Emmons Loom Harness Co.
Shambow Shuttle Co.
Walraven Co.

Reels.
Cocker Mch. & Fdry. Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Gallaudet Aircraft Corp.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

Reflectors—Lamp.
(See Lamp Reflectors).

Regulators—Liquid Level.
General Electric Co.

Regulators—Pressure.
General Electric Co.

Regulators—Temperature.
(See Temperature Controllers).

Reinforcing Slag.
Birmingham Slag Co.

Repairing—Electrical.
Bryan Electric Co.
Westinghouse Elec. & Mfg. Co.

Repairing—Textile Machinery, Etc.
Autogenous Welding Co.
General Machine Works.
Southern Spindle & Flyer Co.
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General Machine Works.
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Whitinsville Spinning Ring Co.
Whitin Machine Works.

Rings—Spinning.
(See Spinning Rings).

Rocker Shaft Bearings.
(See Bearings).

Rolls—Calender.
Butterworth & Sons Co., H. W.
Roy & Son Co., B. S.
Textile Finishing Machinery Co.

Rolls—Rubber Covered.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co.

Rolls—Steel.
Butterworth & Sons Co., H. W.
Southern Spindle & Flyer Co.
Textile Finishing Machinery Co.

Roofing.
American Roofing & Paint Co.
Barrett Co., The.
Cortright Metal Roofing Co.
Dowman, George.
Wadsworth, Howland & Co.
Walraven Co.

Roof and Cement Coating.
American Roofing & Paint Co.
Barrett Co.
Du Pont de Nemours & Co., E. I.
Johnson & Co. Inc., Oliver.
Wadsworth, Howland & Co.

Rope—Transmission.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Link-Belt Company.
Walraven Co.

Roving Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Rubber Goods.
Estes Surgical Supply Co.
Perryman-Burson Co.

Rubber Stamps.
(See Stamps, Stencils, Etc)

Salt.
Rock Glen Salt Co.

Sanitary Products.
Crane Co.
Estes Surgical Supply Co.
Manufacturing Equipment & Engineering Co.
Perryman-Burson Co.
Rundle-Spence Mfg. Co.
Sanitas Co.
Taylor, Halsey W.
Twentieth Century Brass Mfg. Co.
Vogel Co., Jos. A.

Sash-Window—Steel.
Dowman, Geo.
Lupton's Sons Co., David.

Scale Preventer—Boiler.
(See Boiler Feed Water Purification).

Screens (Moving Picture).
Monarch Theatre Supply Co.
Southern Theatre Equipment Co.

Screens and Sieves—Perforated.
Allis-Chalmers Mfg. Co.
Erdle Perforating Co.
Link-Belt Company.

Scouring Machinery.
(See Washers (Cloth)

Scrubbing Machine—Floor.
American Scrubbing Mch. Co.

Scrubbing and Washing Powders.
India Alkali Works.
Mathieson Alkali Works.
Warren Soap Mfg. Co.

Second Hand Machinery and Supplies.
Bryan Electric Co.
Nashville Industrial Corp.
Toomey, Frank, Inc.
Walraven Co.

Sewing Machines.
Merrow Machine Co., The.
Textile Finishing Machinery Co.

Shades—Electric Lamp.
(See Reflectors).

Shafting and Hangers.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Fafnir Bearing Co.
Link-Belt Co.
Skayef Ball Bearing Co.
Walraven Co., The.
Wood's Sons Co., T. B.

Shears.
Roy & Sons Co., B. S.

Shelving—Sectional Steel.
Collins, J. D.
Dowman, George
Hyatt Roller Bearing Co.
Lupton's Sons Co., David.
Sanymetal Products Co.
Vonnegut Hardware Co.

Shingles—Asphalt.
Barrett Co.

Shingles—Metal.
Cortright Metal Roofing Co.
Dowman, George

Shingles—Wood.
Southern Cypress Mfg. Asso.

Shipping Room Machinery and Supplies.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Collins, J. D.
Diamond State Fibre Co.
Hightower Box & Tank Co.
Lane & Bro., W. T.
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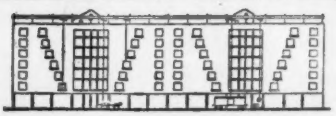

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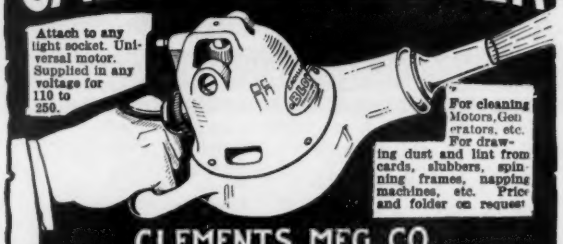
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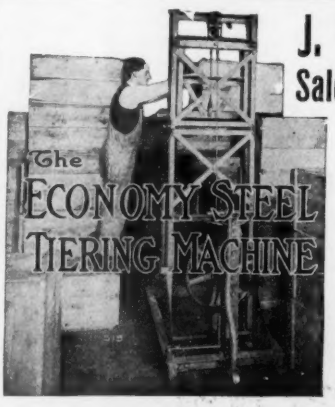

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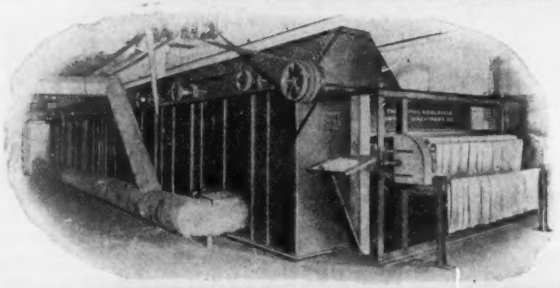

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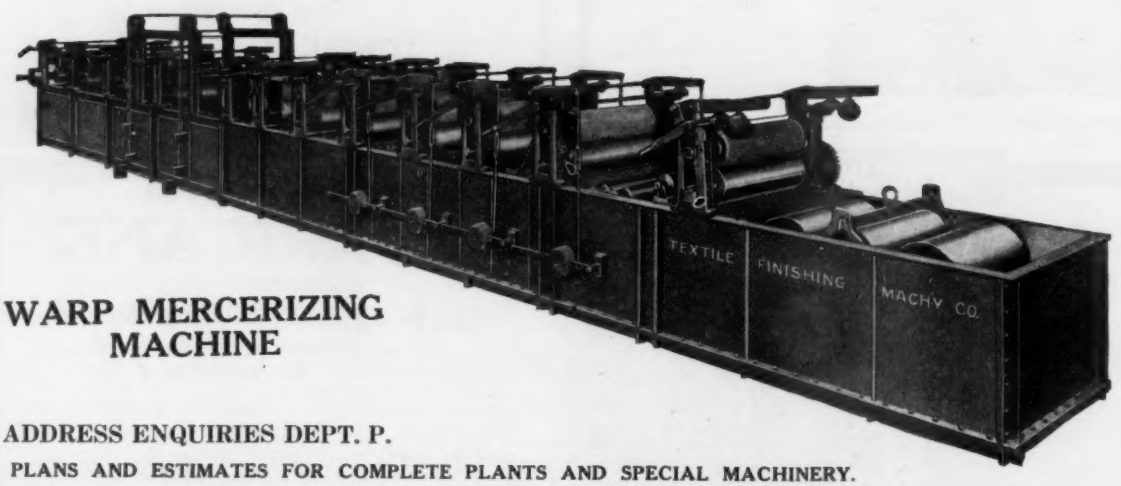

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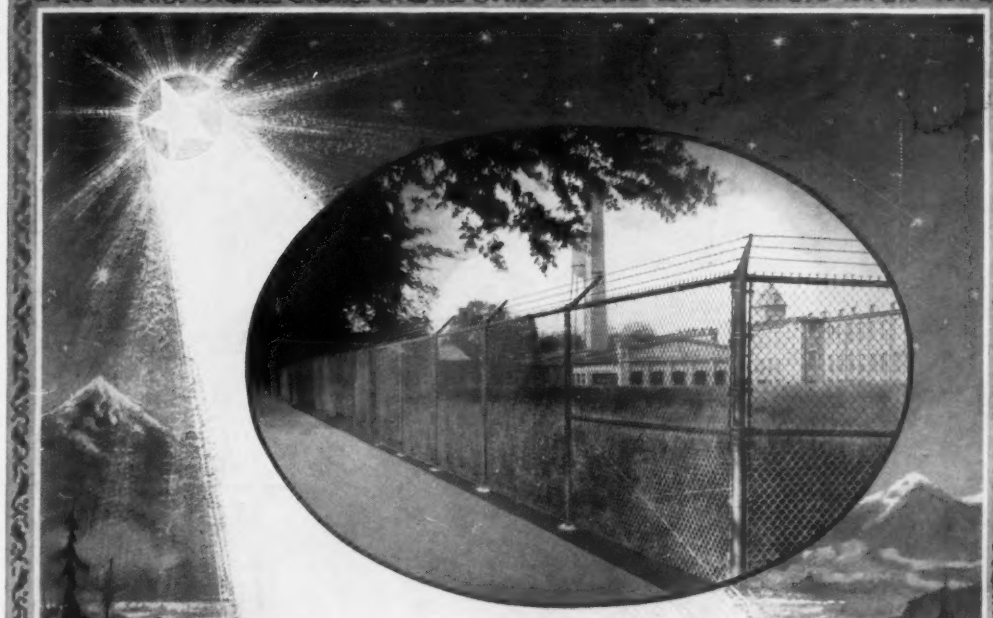

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